

## 1. Introduction

This package<sup>1</sup> currently supports generation of PDF/X-, PDF/A- and PDF/E-compliant documents, using pdfTeX, in most of their variants; see the complete list in Section 2.1 below. As of TeX Live 2016 it now also works with LuaTeX and XeTeX, when using appropriate command-line options<sup>2</sup>, but with some limitations — see Sections 3.1.1 and 3.1.2. By ‘supports’, we mean that the package provides correct and sufficient means to declare that a document conforms with a stated PDF variant (PDF/X, PDF/A, PDF/E, PDF/VT, PDF/UA, etc.) along with the version and/or level of conformance. This package also allows appropriate Metadata and Color Profile to be specified, according to the requirements of the PDF variant.

Metadata elements, most of which must ultimately be written as XML using the UTF-8 encoding, is provided via a file named `\jobname.xmpdata`, for the running TeX job. Without such a file, providing some required information as well as a large range of optional data, a fully validating PDF file cannot be achieved. The PDF can be created, having the correct visual appearance on all pages, but it will not pass validation checks. Sections 2.2 and 4.1 describe how this file should be constructed.

What this package *does not do* is to check for all the details of document structure and type of content that may be required (or restricted) within a PDF variant. For example, PDF/VT [14] requires well-structured parts, using Form XObject sections tagged as ‘/DPart’. Similarly PDF/A-1a (and 2a and 3a) [16, 17, 18] require a fully ‘Tagged PDF’, including a detailed structure tagging which envelops the complete contents of the document, as does also PDF/UA [24]. This is beyond the current version of TeX engines, as commonly shipped. So while this package provides enough to meet the declaration, metadata and font-handling aspects for these PDF/A variants, it is not sufficient to produce fully conforming PDFs. However, with extra pdfTeX-based software or macro coding that is capable of producing ‘Tagged PDF’, this package can be used as part of the overall workflow to produce fully conforming documents.

### 1.1. PDF standards

PDF/X and PDF/A are umbrella terms used to denote several ISO standards [8, 9, 10, 12, 13, 16, 17, 18] that define different subsets of the PDF standard [1, 20]. The objective of PDF/X is to facilitate graphics exchange between document creator and printer and therefore, has all requirements related to printing. For instance, in PDF/X, all fonts need to be embedded and all images need to be CMYK or spot colors. PDF/X-2 and PDF/X-3 accept calibrated RGB and CIELAB colors along with all other specifications of PDF/X. Since 2005 other variants of PDF/X have emerged, as extra effects (such as layering and transparency) have been supported within the PDF standard itself. The full range of versions and conformance supported in this package is discussed below in Section 2.1.

PDF/A defines a profile for archiving PDF documents, which ensures the documents can be reproduced in the exact same way in years to come. A key element to achieving this is that PDF/A documents are 100% self-contained. All the information needed to display the document in the same manner every time is embedded in the file. A PDF/A document is not permitted to be reliant on information from external sources. Other restrictions include avoidance of audio/video content, JavaScript and encryption. Mandatory inclusion of fonts, color profile and standards-based metadata are absolutely essential for PDF/A. Later versions allow for use of image compression and file attachments.

PDF/E is an ISO standard [19] intended for documents used in engineering workflows. PDF/VT [14] allows for high-volume customised form printing, such as utility bills. PDF/UA

<sup>1</sup> An earlier version of this documentation was published as [27]. All the changes since then have been developed and coded by the 3rd-listed author.

<sup>2</sup> The required invocation is: `xelatex --shell-escape -output-driver="xdvipdfmx -z 0" <filename>.tex`

(‘Universal Accessibility’) has emerged as a standard [24, 3, 4] supporting Assistive Technologies, incorporating web-accessibility guidelines (WCAG) for electronic documents. In future, PDF/H may emerge for health records and medical-related documents. Other applications can be envisaged. Declarations and Metadata are supported for the first three of these. The others are the subject of further work; revised versions of this package can be expected in later years.

More complete descriptions of these standards and their usage can be found on Wikipedia pages [29]. These pages also include comprehensive links to web resources, guides, commentaries, discussions and whatever else is relevant to how the standards have been established and how they can be used.

## 2. Usage

The package can be loaded with the command:

```
\usepackage[<option>]{pdfx}
```

where the options are as follows.

### 2.1. Package options

#### 2.1.1. PDF/A options

PDF/A is an ISO standard [16, 17, 18] intended for long-term archiving of electronic documents. It therefore emphasizes self-containedness and reproducibility, as well as machine-readable metadata. The PDF/A standard has three conformance levels ‘a’, ‘b’, and ‘u’. Level ‘a’ is the strictest, but is not yet fully implemented by the pdfx package. Conformance level ‘u’ has the same requirements as level ‘b’, but with the additional requirement that all text in the document must have a Unicode mapping. However, the pdfx package produces such Unicode mappings even in level ‘b’ files. The standard also has three different versions 1, 2, and 3, which were standardized in 2005, 2011 and 2012, respectively. Earlier versions contain a subset of the features of later versions, so for maximum portability, it is preferable to use a lower-numbered version. There is no conformance level ‘u’ in version 1 of the standard. For many typical uses of PDF/A, it is sufficient to use PDF/A-1b.

- a-1a: generate PDF/A-1a. Experimental, not fully implemented.
- a-1b: generate PDF/A-1b.
- a-2a: generate PDF/A-2a. Experimental, not fully implemented.
- a-2b: generate PDF/A-2b.
- a-2u: generate PDF/A-2u.
- a-3a: generate PDF/A-3a. Experimental, not fully implemented.
- a-3b: generate PDF/A-3b.
- a-3u: generate PDF/A-3u.

By ‘Experimental, not fully implemented’ here we mean primarily that the document structure, as required for ‘Tagged PDF’, is not handled by this package. Using other pdfT<sub>E</sub>X-based software that is capable of producing such complete tagging, conforming documents can indeed be produced.

## 2.1.2. PDF/E options

PDF/E is an ISO standard [19] intended for documents used in engineering workflows. There is only one version of the PDF/E standard so far, and it is called PDF/E-1.

- e-1: generate PDF/E-1.
- e: same as e-1.

## 2.1.3. PDF/UA options

PDF/UA is an ISO and ANSI standard [24, 4] intended for making structured documents readable and navigable using Assistive Technology; e.g., screen-readers, Braille keyboards and such-like. Documents prepared this way can be easily saved in other formats which preserve the structure, such as XML, HTML, and (Microsoft) Word-based formats.

- ua-1: generate PDF/UA-1.
- ua: same as ua-1.

## 2.1.4. PDF/VT options

PDF/VT is an ISO standard intended as an exchange format for variable and transactional printing, and is an extension of the PDF/X-4 standard. The standard specifies three PDF/VT conformance levels. Level 1 is for single-file exchange, level 2 is for multi-file exchange, and level 2s is for streamed delivery. Currently, none of the PDF/VT conformance levels are fully implemented by the pdfx package.

- vt-1: generate PDF/VT-1, based on PDF/X-4. Experimental, not fully implemented
- vt-2: generate PDF/VT-2, based on PDF/X-5pg. Experimental, not fully implemented.
- vt-2s: generate PDF/VT-2s. Experimental, not fully implemented.

By ‘Experimental, not fully implemented’ here we mean primarily that the structuring of a document into ‘DPart’ sections, as Form XObjects, is not handled by this package. This is possible with current pdfTeX software, but not yet in a way that lends itself easily to full automation, due to requirements of knowing the internal object number of certain internal PDF constructs. All the other aspects: PDFInfo declaration, Metadata and Color Profile, of the PDF/VT variants are correctly handled.

## 2.1.5. PDF/X options

PDF/X is an ISO standard intended for graphics interchange. It emphasizes printing-related requirements, such as embedded fonts and color profiles. The PDF/X standard has a large number of variants and conformance levels. The basic variants are X-1, X-1a, X-3, X-4, and X-5. (Note that a revised version of the X-2 standard was published in 2003 but withdrawn as an ISO standard in 2011, basically due to lack of interest in using it). The PDF/X-1a standard exists in revisions of 2001 and 2003, the PDF/X-3 standard exists in revisions of 2002 and 2003, and the PDF/X-4 and PDF/X-5 standards exist in revisions of 2008 and 2010. Moreover, some of these standards have a ‘p’ version, which permits the use of an externally supplied color profile (instead of an embedded one), and/or a ‘g’ version, which permits the use of external graphical content. Moreover, PDF/X-5 has an ‘n’ version, which extends PDF/X-4p by permitting additional ‘Custom’ color spaces other than Grayscale, RGB, and CMYK. For many typical uses of PDF/X, it is sufficient to use PDF/X-1a.

- x-1: generate PDF/X-1; now obsolete, doesn’t validate.

- **x-1a**: generate PDF/X-1a. Options **x-1a1** and **x-1a3** are also available to specify PDF/X-1a:2001 or PDF/X-1a:2003 explicitly.
- **x-2**: generate PDF/X-2; unpublished, doesn't validate.
- **x-3**: generate PDF/X-3. Options **x-302** and **x-303** are also available to specify PDF/X-3:2002 or PDF/X-3:2003 explicitly.
- **x-4**: generate PDF/X-4. Options **x-408** and **x-410** are also available to specify PDF/X-4:2008 or PDF/X-4:2010 explicitly.
- **x-4p**: generate PDF/X-4p. Options **x-4p08** and **x-4p10** are also available to specify PDF/X-4p:2008 or PDF/X-4p:2010 explicitly.
- **x-5g**: generate PDF/X-5g. Options **x-5g08** and **x-5g10** are also available to specify PDF/X-5g:2008 or PDF/X-5g:2010 explicitly.
- **x-5n**: generate PDF/X-5n. Options **x-5n08** and **x-5n10** are also available to specify PDF/X-5n:2008 or PDF/X-5n:2010 explicitly. Experimental, not fully implemented.
- **x-5pg**: generate PDF/X-5pg. Options **x-5pg08** and **x-5pg10** are also available to specify PDF/X-5pg:2008 or PDF/X-5pg:2010 explicitly.

## 2.1.6. Other options

These options are experimental and should not normally be used.

- **useBOM**: generate an explicit UTF-8 byte-order marker in the embedded XMP metadata, and make the XMP packet writable. Neither of these features are required by the PDF/A standard, but there exist some PDF/A validators (reportedly [validatepdfa.com](http://validatepdfa.com)) that seem to require them. Note: the implementation of this feature is experimental and may break with future updates to the `xmptoincl` package.
- **noBOM**: do not generate the optional byte-order marker. (default)
- **noerr**: avoids stopping when making PDF/X with an RGB profile, and at other unusual situations; e.g., PDF/UA without also PDF/A.
- **pdf12**: use PDF 1.2, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- **pdf13**: use PDF 1.3, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- **pdf14**: use PDF 1.4, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- **pdf15**: use PDF 1.5, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- **pdf16**: use PDF 1.6, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- **pdf17**: use PDF 1.7, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.

## 2.1.7. XMP language options

These options allow for characters in alphabets other than those used for English and Western European languages to be used within the `.xmldata` file (see Section 2.2), supported through  $\text{\LaTeX}$  character representation macros.

- **latxmp**: extended Latin blocks, Ux0180–Ux024F and Ux1E00–Ux1EFF

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- **armxmp**: armenian letters and ligatures, Ux0530–Ux058F, via macros `\armyba`, `\armfe`, `\armcomma`, etc.
- **cyrxmp**: cyrillic letters and accents, Ux0400–Ux04FF and Ux0500–Ux0527 via macros `\cyra`, `\CYRN`, etc.
- **grkxmp**: greek letters and diacritics, Ux0370–Ux03FF and Ux1F00–Ux1FFF via macros `\textalpha`, `\textPi`, etc.
- **hebxmp**: some hebrew letters and marks, Ux05C0–Ux05F4 via macros `\hebalef`, `\hebtav`, `\doubleyod`, etc.
- **arbxmp**: some arabic letters and marks, Ux0600–Ux06FF via macros `\hamza`, `\alef`, `\sukun`, etc.
- **vnmxmp**: vietnamese letters and accents, Ux1EA0–Ux1EFF via macros `\abreve`, `\uhorn`, `\ECIRCUMFLEX`, etc.
- **ipaxmp**: phonetic extensions, Ux0250–Ux02AF and Ux1D00–Ux1DFF
- **mathxmp**: mathematical letters, symbols, operators arrows, alphanumeric forms.
- **allxmp**: all of the above, as well as those listed next; used primarily for testing compatibility with other packages.

The characters supported by these options include those supported by `hyperref.sty` via the PDFdoc encodings (PD1 and PU) for inclusion in PDF files. Extra support is provided for math alphabets. For Armenian, the macros defined by ArmT<sub>E</sub>X are supported.

Further options allow direct (enclosed) input of upper 8-bit characters, from encodings such as Latin-1–Latin-9, KOI8-R, LGR (Greek), ArmSCII8, and a few more. Use of these requires a carefully controlled parsing regime. Here we list the package options that declare such content may be present in the `.xmldata` file. A detailed account of how these are used is given in Section 4.1 (“Multilingual Metadata”).

- **LATxmp**: support for direct use of the upper-range characters (byte codes 160–255) for input encodings Latin1–Latin9, for Latin-based alphabets as used in European countries and elsewhere. This defines parser macros `\textLAT`, `\textLII`, ..., `\textLIX`. All support from `latxmp` is loaded also.
- **KOIxmp**: support for direct use of cyrillic letters by use of upper-range characters (byte codes 148–255) under input encodings KOI8-R and KOI8-RU, using `\textKOI` as parser macro. All support from `cyrxmp` is loaded also.
- **LGRxmp**: support for greek letters entered using either the LGR input transliteration of ASCII characters, or the ISO-8859-7 encoding of upper-range characters (byte codes 160–255), or a combination of both, using `\textLGR` as parser macro. All support from `grkxmp` is loaded also.
- **AR8xmp**: support for armenian letters entered using the ArmT<sub>E</sub>X 2.0 input transliteration of ASCII characters, or the ArmSCII8 encoding of upper-range characters (byte codes 160–255), or a combination of both, using `\textARM` as parser macro. All support from `armxmp` is loaded also.
- **HEBxmp**: support for hebrew letters entered using either LHE input transliteration of ASCII characters, or the CP1255, CP862 or ISO-8859-8 (HE8) encoding of upper-range characters (byte codes 160–255), or a combination of these using `\textLHE`, `\textHEBO`, `\textHEB` as parser macros. All support from `hebxmp` is loaded also.

These ‘parser’ options have received limited testing, so please report any mistakes in the UTF-8 output that you may encounter.

## 2.2. Data file for metadata

As mentioned above, standards-compliant PDF documents require document-level metadata to be included. This, known as an ‘XMP packet’ [2, 15], is like having a library catalog card included within the PDF itself. It is an unencrypted portion of the PDF file, with data expressed in Extensible Markup Language (XML), using Resource Description Format (RDF [28]) syntax, encoded as UTF-8 so readable by any text editing software on any modern computing platform.

Some advantages of doing this are clear.

- For a librarian: cataloguing information is available within the file itself, without the need to search explicitly in the visual layout of the content or elsewhere;
- All actual libraries cataloguing this PDF can have consistent information; including web-based indexing sites such as Google.
- For the author(s): who can specify the kind of information most appropriate to help readers understand the nature and purpose of the document.

The pdfx package builds the XMP metadata from information supplied via a special data file called `\jobname.xmpdata`. Here, `\jobname` is usually the basename of the document’s main `.tex` file. For example, if your document source is in the file `main.tex`, then the metadata must be in a file called `main.xmpdata`. None of the individual metadata fields are mandatory, but for most documents, it makes sense to specify at least the title and the author. For more technical aspects of metadata and its uses, consult the work of the Dublin Core Initiative [6] and PRISM [26].

Here is a short `.xmpdata` file:

```
\Title{Baking through the ages}
\Author{A. Baker\sep C. Kneader}
\Language{en-GB}
\Keywords{cookies\sep muffins\sep cakes}
\Publisher{Baking International}
```

You should note that multiple authors and keywords have been separated by `\sep`. This `\sep` macro serves a technical purpose and is permitted within the `\Author`, `\Keywords`, and `\Publisher` fields, as well as some others. See §2.3 below for a complete listing of the supported author-supplied metadata fields.

After processing, the local directory contains a file named such as `pdfa.xmpi` or `pdfa.xmpi` or `pdfx.xmpi` according to the PDF variant desired. This file is the complete XMP Metadata packet. It can be checked for validity, using an online validator, such as at [www.pdfliib.com](http://www.pdfliib.com).

**Warning:** The `\jobname.xmpdata` file may be included in the main document source, within a `{filecontents*}` environment, provided this comes *before* the `\documentclass` command, as follows.

```
\begin{filecontents*}{\jobname.xmpdata}
\Title{Baking through the ages}
\Author{A. Baker\sep C. Kneader}
\Language{en-GB}
\Keywords{cookies\sep muffins\sep cakes}
\Publisher{Baking International}
\end{filecontents*}
\documentclass[11pt,a4paper]{article}
...
```

Including the metadata with the T<sub>E</sub>X source is very convenient. Having it at the top of the file also brings attention to it, placing emphasis on the desirability of including metadata, and



keeping it accurate while the main content of the document is subject to changes or revision. Macro definitions can also occur prior to the `\documentclass` command, including any that may be needed within the metadata. An example of this is apparent in Figure 2 occurring later.

However, this ordering is also extremely important, else any non-ascii UTF-8 byte sequences can become active characters and expand upon data being written out, rather than remaining as inactive bytes. If you edit the metadata supplied this way, remember to remove the existing copy of `\jobname.xmpdata` file before the next processing run, as  $\text{\TeX}$  does not write a new copy of the file when it exists on disk already, within the current working directory or elsewhere that  $\text{\TeX}$  may find. In development or testing situations the filename may need to be given as `./\jobname.xmpdata`, else an older version may be loaded in error.

Experienced users/programmers can employ the `\write18` mechanism<sup>3</sup>, together with the `--shell-escape` command-line option, to automatically execute a shell command that removes `\jobname.xmpdata` on every (or on selected) processing runs. This is only useful when the metadata changes, for whatever reason.

Other places for the `{filecontents*}` environment can work, but *only* when it contains *no* non-ascii UTF-8 byte sequences. See Section 2.4 below for more information on the macros that can be safely used within `.xmpdata` metadata files.

## 2.3. List of supported metadata fields

Following is a complete list of user-definable metadata fields currently supported, separated into particular groupings. Each command is accompanied by the specific XML tagged field name (with namespace) that is placed into the document-level Metadata packet, as well as the kind of information being conveyed. More may be added in the future. These commands can *only* be used within the `.xmpdata` file.

Most commands take an optional argument specifying the natural language, using RFC5646 (BCP 47) [7] codes, in which the metadata field is given. Languages for multiple entries can use e.g., `\sep[de] . . .`. Only those fields requiring a specific format (e.g. dates) do *not* support language specifiers; these are indicated with <sup>f</sup>. Fields allowing more than one value are indicated with \*. Multiple values may be given as separate instances of the macro, or as a single instance with the values delimited by `\sep`, as in the example above.

### 2.3.1. General information:

- `*\Author:` (dc:creator)  
the document's human author(s). Separate multiple authors with `\sep`.
- `*\Title:` (dc:title)  
the document's title; multiple language versions are supported.
- `*f\Language:` (dc:language)  
list of languages used within the document.
- `*\Keywords:` (dc:subject)  
list of keywords, separated with `\sep`.
- `*\Publisher:` (dc:publisher)  
the publisher(s). Multiple pieces in a publishing chain should be separated with `\sep`.
- `*\Subject:` (dc:description)  
the abstract, or short description.

<sup>3</sup>If you don't already know what this is, they you probably should not try using it :-).

## 2.3.2. Copyright information:

- \Copyright: (dc:rights)  
a copyright statement.
- <sup>f</sup>\CopyrightURL: (xmpRights:WebStatement)  
location of a web page describing the owner and/or rights statement for this document.
- <sup>f</sup>\Copyrighted: (xmpRights:Marked)  
‘True’ if the document is copyrighted, and ‘False’ if it isn’t. This is automatically set to ‘True’ if either \Copyright or \CopyrightURL is specified, but this can be overridden. For example, if the copyright statement is ‘Public Domain’, then specify also \Copyrighted{False}.
- \*\Owner: (xmpRights:Owner)  
specifies the owner(s) of the document or resource.
- <sup>f</sup>\CertificateURL: (xmpRights:Certificate)  
gives the URL to online proof of ownership, if available.

## 2.3.3. more Dublin Core metadata:

From version 1.6 of pdfx.sty, the following fields can be used to provide a greater range of information to be specified as metadata.

- \*\Contributor: (dc:contributor)  
contributor(s) other than author(s) of the PDF document.
- \Coverage: (dc:coverage)  
statement about the extent or scope of the document’s contents.
- <sup>f</sup>\Date: (dc:date)  
date(s) when something significant occurred relating to the resource (e.g., version changes); must be in ISO date format YYYY-MM-DD or YYYY-MM.
- <sup>f</sup>\PublicationType: (dc:type)  
The type of publication. If specified, must be one of ‘book’, ‘catalog’, ‘feed’, ‘journal’, ‘magazine’, ‘manual’, ‘newsletter’, ‘pamphlet’. This is automatically set to ‘journal’ if \Journaltitle is specified (see below), but can be overridden.
- \*\Relation: (dc:relation)  
how this PDF or resource relates to other document(s) or resources.
- <sup>f</sup>\Source: (dc:source)  
specifies a source document from which the PDF is derived.
- <sup>f</sup>\Doi: (dc:identifier, prism:doi, prism:url)  
Digital Object Identifier (DOI) for the document, without the leading ‘doi:’.
- <sup>f</sup>\ISBN: (dc:identifier)  
the ISBN for the PDF itself, or Book/Monograph of which it is part.
- <sup>f</sup>\URLlink: (dc:identifier, prism:url)  
gives a URL address for an online copy of the document.

The remaining Dublin Core field (dc:format) is always set to ‘application/pdf’.

## 2.3.4. Publication information:

The following macros allow for inclusion of publication related metadata fields, as specified by PRISM [26] to meet publishing requirements.



- Introduction
- Usage
- Installing
- Multilingual and Technical Considerations
- Bibliography
- References
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- \Journaltitle: (prism:issueName)  
The title of the journal in which the document was published.
- <sup>f</sup>\Journalnumber: (prism:issn)  
The ISSN for the journal/series in which the document was published.
- <sup>f</sup>\Volume: (prism:volume)  
Journal volume.
- <sup>f</sup>\Issue: (prism:number)  
Journal issue/number.
- <sup>f</sup>\Firstpage: (prism:startingPage, prism:pageRange)  
First page number of the published version of the document.
- <sup>f</sup>\Lastpage: (prism:endingPage, prism:pageRange)  
Last page number of the published version of the document.
- \CoverDisplayDate: (prism:coverDisplayDate)  
Date on the cover of the journal issue, as a human-readable text string.
- <sup>f</sup>\CoverDate: (prism:coverDate)  
Date on the cover of the journal issue, in a format suitable for storing in a database field with a ‘date’ data type; e.g. YYYY-MM, or YYYY-MM-DD.

This is an area which can be expanded, to deal with more kinds of publication and metadata fields. The ExtensionSchema [23] technique is used to add new fields. Examples of this can be found in the template files pdfx.xmp, pdfa.xmp, pdfa.xmp.

### 2.3.5. Backward Compatibility

The following macros are also recognised, for backward compatibility with earlier versions of the package.

- \* \AuthoritativeDomain: (pdfx:AuthoritativeDomain)  
specifies extra names (e.g., of companies) associated to the existence of the PDF or resource.
- \Creator: (xmp:CreatorTool)  
synonymous with \CreatorTool which is usually handled automatically anyway, but can be over-ridden.
- \Org: synonymous with \Publisher.
- \WebStatement: synonymous with \CopyrightURL.

### 2.3.6. more XMP metadata:

- \* \Advisory: (xmp:Advisory)  
noteworthy information; e.g., revision data or changes.
- <sup>f</sup>\BaseURL: (xmp:BaseURL)  
base-URL for relative hyperlinks within the PDF.
- \* \Identifier: (xmp:Identifier)  
more advance forms than (dc:identifier); see [2, 15].
- \Nickname: (xmp:Nickname)  
a pseudonym or ‘nickname’ as a colloquial identifier for the resource.
- \* \Thumbnails: (xmp:Thumbnails)  
allows small page images to be associated with each page of the PDF. An appropriate XML-compatible representation is required for such images.

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- Multilingual and Technical Considerations
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## 2.3.7. PDF standards metadata:

The following metadata fields are generated automatically by the T<sub>E</sub>X engine. Some are dependent on the particular loading options that specify the desired compliance with a PDF standard, and level of conformance. There are no separate user-macros to alter these. The first three dates are usually set to be identical.

- (xmp:CreateDate) : creation date&time of the PDF.
- (xmp:MetadataDate) : creation date&time of the Metadata for the PDF.
- (xmp:ModifyDate) : date&time of latest modifications to the PDF.
- (xmpMM:DocumentID) : unique identifier for the PDF, based on MD5 sum.
- (xmpMM:InstanceID) : unique identifier based on creation date&time.
- (pdf:Producer) : T<sub>E</sub>X engine used; either ‘LuaT<sub>E</sub>X’, ‘XeT<sub>E</sub>X’, ‘pdfT<sub>E</sub>X’.
- (pdf:Trapped) : currently always set to ‘False’.
- (pdfaid:part) : 1, 2 or 3 for PDF/A-?
- (pdfaid:conformance) : a, b or u for PDF/A-??
- (pdfuaid:part) : currently 1 for PDF/UA-1
- (pdf:ISO\_PDFAVersion) : currently 1 for PDF/E-1
- (pdf:Version) : PDF/X-1, PDF/X-2 or PDF/X-3
- (pdfx:GTS\_PDFXVersion) : e.g., PDF/X-1a:2003 up to PDF/X-3 ; but no year for PDF/X-4 and PDF/X-5 variants
- (pdfx:GTS\_PDFXConformance) : e.g., PDF/X-1a:2003 up to PDF/X-2
- (pdfxid:GTS\_PDFXVersion) : e.g., PDF/X-4p:2008 after PDF/X-3
- (pdfvtid:GTS\_PDFVTVersion) : e.g., PDF/VT-2s for PDF/VT
- (pdfvtid:GTS\_PDFVTModDate) : same as xmp:ModifyDate

## 2.4. Symbols permitted in metadata

Within the metadata, all printable ASCII characters except \, {, } and % represent themselves. Also, all printable Unicode characters from the basic multilingual plane (i.e., up to code point U+FFFF) can be used directly with the UTF-8 encoding. (Please note: encodings other than UTF-8 are not supported in the metadata, except as arguments to ‘parser-macros’; see Section 2.1.7). Consecutive whitespace characters are combined into a single space. Whitespace after a macro such as \copyright, \backslash, or \sep is ignored. Blank lines are not permitted. Moreover, the following markup can be used:

- “\ ”: a literal space (for example after a macro)
- \%: a literal %
- \{: a literal {
- \}: a literal }
- \backslash: a literal backslash \
- \copyright: the copyright symbol ©

The macro \sep is permitted within \Author, \Keywords, \Publisher, and other macros marked with \* above. Its purpose is to separate multiple authors, keywords, etc. to appear as separate list items appropriately and consistently in the different ways that such information is represented within the PDF file. The package takes care of this when \sep is used. For example, in the XMP metadata, it expands as </rdf:li><rdf:li> tagging.

## 2.4.1. PDF Info strings

When `\sep` is not used within its argument, the metadata from `\Title`, `\Author` and `\Keywords` is also included in the PDF `/Info` dictionary. When this is the case, validation for the declared standard will occur only if the corresponding `/Info` item and XMP metadata field convert to exactly the same Unicode string. This cannot happen when `\sep` is used, so the `/Info` items are then not populated.

Unfortunately not all PDF browsers (in particular, older ones and much Apple software) give ready access to the XMP metadata packet. Some authors want to see everything using e.g., the Unix/Linux `pdfinfo` command. In fact there is the `-meta` option to get the complete metadata packet. This can give more than what one wants, so use it as follows:

```
pdfinfo -meta <filename>.pdf | grep 'dc:'
```

to extract just the Dublin Core metadata fields.

Another possibility is to *not* use `\sep` with multiple authors and/or keywords. Instead replace it with simply `,` `'`. We do not recommend doing this, as more sophisticated metadata tools will see the result as a single value, rather than multiple authors, say. Different language codes cannot be applied when done this way. However, some authors may find this a satisfactory solution that suits their own tools.

## 2.5. Macros permitted in metadata

Other T<sub>E</sub>X macros actually can be used, provided the author is very careful and not ask for too-complicated T<sub>E</sub>X or L<sup>A</sup>T<sub>E</sub>X expansions into internal commands or non-character primitives; basically just accents, macros for Latin-based special characters, and simple textual replacements, perhaps with a simple parameter. A special macro `\pdfxEnableCommands{...}` is provided to help resolve difficulties that may arise.

Here is an example<sup>4</sup> of the use of `\pdfxEnableCommands`, which occurs with the name of one of our authors (Hàn Thế Thành) due to the doubly-accented letter ê. It is usual to define a macro such as: `\def\thanh{H\`an Th\`{\`e} Thanh}`. In previous versions of the pdfx package, use of such a macro within the `.xmpdata` file, in the Copyright information say, could result in the accent macros expanding into internal primitives, such as

```
H\unhbox \voidb@x \bgroup \let \unhbox \voidb@x \setbox \@tempboxa ...
```

going on for many lines. This clearly has no place within the XMP metadata. To get around this, one could try using simplified macro definitions

```
\pdfxEnableCommands{
  \def\`#1{#1^cc^80}\def\'#1{#1^cc^81}\def\`#1{#1^cc^82}}
```

where the `^cc^80`, `^cc^81`, `^cc^82` cause T<sub>E</sub>X to generate the correct UTF-8 bytes for ‘combining accent’ characters.

This works fine for metadata fields that appear just in the XMP packet. However, it is not sufficient for the PDF `/Author` key, which must exactly match with the `dc:creator` metadata element. What is needed instead is

```
\pdfxEnableCommands{
  \def\thanh{H^c3^aa0n Th\eee Thanh}\def\eee{^c3^aa^cc^81 }}
```

or the above with ‘à’ typed directly as UTF-8 instead of `^c3^aa0` and ‘ê’ in UTF-8 for `^c3^aa`. The reason for this is due to the `\pdfstringdef` command, which constructs the accented latin

<sup>4</sup> Other use cases are discussed with regard to Figures 12 and 16.

letters as single combined characters à and ê, without resorting to combining accents, wherever possible. If the Metadata does not have the same, irrespective of Unicode normalisation, then validation fails.

With version (1.5.6) of the pdfx package, such difficulties have been overcome, at least for characters used in Western European, Latin-based languages. The input encoding used when reading the .xmpdata file now includes interpretations of T<sub>E</sub>X’s usual accent commands to produce the required UTF-8 byte sequences.

Since version (1.5.8) this input encoding was extended to include macro definitions covering T<sub>E</sub>X’s internal character representation of other alphabets (e.g., extended Latin, Cyrillic, Greek, etc.). However this can become memory intensive, requiring a large number of macro definitions, most of which will never be used. So loading options are provided, enabling a document author to choose only those that may be relevant. Currently these are as in Section 2.1.7.

A significant portion of the Unicode Basic Plane characters can be covered this way. Modules could even be provided for CJK character sets and mathematical symbols, etc. However, as this can become memory intensive, significant testing will be required before these become a standard part of the pdfx package.

## 2.6. Color profiles

Most standards compliant PDF documents require a *color profile* to be embedded within the file. In a nutshell, such a profile determines precisely how the colors used in the document will be rendered when printed to a physical medium. This can be used to ensure that the document will look exactly the same, even when it is printed on different printers, with different paper types, etc. The inclusion of a color profile is necessary to make the document completely self-contained.

Since most T<sub>E</sub>X users are not graphics professionals and are not particularly picky about colors, the pdfx package includes default profiles that will be included when nothing else is specified. Therefore, the average user doesn’t have to do anything special about color.

For users who have a specific color profile they wish to use, it is possible to do so by including a `\setRGBcolorprofile` or `\setCMYKcolorprofile` command in the .xmpdata file. Note that PDF/A and PDF/E require a profile of type ‘mnr<sub>t</sub>’ (monitor) which is usually an RGB color profile, while PDF/X and PDF/VT require type ‘prtr’ (printer) which is usually a CMYK color profile; but valid documents can be created with the correct type designed for the other color space. Use the following commands to specify an RGB or CMYK color profile, respectively:

```
\setRGBcolorprofile{<filename>}{<identifier>}{<info string>}{<registry URL>}
\setCMYKcolorprofile{<filename>}{<output intent>}{<identifier>}{<registry URL>}
```

Within the arguments of these macros, the characters <, >, &, ^, \_, #, \$, and ~ can be used as themselves, but % must be escaped as \%.

From version (1.6) the default RGB and CMYK color profiles are now supplied using the `colorprofiles` package by Norbert Preining and Ross Moore [25]. Earlier versions of pdfx.sty set the defaults via:

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
\setRGBcolorprofile{sRGB_IEC61966-2-1_black_scaled.icc}
    {sRGB_IEC61966-2-1_black_scaled}
    {sRGB IEC61966 v2.1 with black scaling}
    {http://www.color.org}

\setCMYKcolorprofile{coated_FOGRA39L_arg1.icc}
    {Coated FOGRA39}
    {FOGRA39 (ISO Coated v2 300\% (ECI))}
    {http://www.argyllcms.com/}
```

These can still be used if the files from earlier version are available on your T<sub>E</sub>X system, but they will need to be requested, as above. Other color profile files may be obtained from the International Color Consortium. Please take a look at <http://www.color.org/iccprofile.xalter>.

Alternatively, color profiles are shipped with many Adobe software applications; these are then available for use also with non-Adobe software. Now the pdfx package includes coding to streamline inclusion of these profiles in PDF documents, or to specify them as ‘external’ profiles, with PDF/X-4p and PDF/X-5pg variants. Two files `AdobeColorProfiles.tex` and `AdobeExternalProfiles.tex` are distributed with the pdfx package. The latter is for use with PDF/X-4p and PDF/X-5pg, which do not require color profiles to be embedded, while the former can be used with other PDF/X variants. Both define commands to use Color Profiles as follows.

<code>\FOGRAXXXIX</code>	Coated FOGRA39 (ISO 12647-2:2004)
<code>\SWOPCGATSI</code>	U.S. Web Coated (SWOP) v2
<code>\JapanColorMMI Coated</code>	Japan Color 2001 Coated
<code>\JapanColorMMI Uncoated</code>	Japan Color 2001 Uncoated
<code>\JapanColorMMI Newspaper</code>	Japan Color 2002 Newspaper
<code>\JapanWebCoatedAd</code>	Japan Web Coated (Ad)
<code>\CoatedGRACoL</code>	Coated GRACoL 2006 (ISO 12647-2:2004)
<code>\SNAPCGATSII</code>	CGATS TR 002
<code>\SWOPCGATSIII</code>	CGATS TR 003
<code>\SWOPCGATSV</code>	CGATS TR 005
<code>\ISOWebCoated</code>	Web Coated FOGRA28 (ISO 12647-2:2004)
<code>\ISOCoatedECI</code>	ISO Coated v2 (ECI)
<code>\CoatedFOGRA</code>	Coated FOGRA27 (ISO 12647-2:2004)
<code>\WebCoatedFOGRA</code>	Web Coated FOGRA28 (ISO 12647-2:2004)
<code>\UncoatedFOGRA</code>	Uncoated FOGRA29 (ISO 12647-2:2004)
<code>\IFRAXXVI</code>	ISOnewspaper26v4 ISO/DIS 12647-3:2004
<code>\IFRAXXX</code>	ISOnewspaper30v4 ISO/DIS 12647-3:2004

As of the time of first compiling this list, only the first six of these result in PDFs which can validate with external profiles (i.e., for PDF/X-4p and PDF/X-5pg) using the then-current versions of Adobe Acrobat Pro software. It is unclear whether the others (incl. `\IFRAXXVI` and `\IFRAXXX`) failed due to incorrect data or problems in the validation software. Since then, with updates to Acrobat Pro, almost all the others have been verified to work, except `\IFRAXXX` which seems no longer available. Thus these commands come with a ‘use at own risk’ clause.

For ‘external’ profiles, there is a command `\setEXTERNALprofile`, taking 9 arguments, that must be used. Consult `AdobeExternalProfiles.tex` for examples of its use.

All but the last of the macros listed above can also be used for valid embedded profiles, providing the corresponding files can be found. The following macros are used to set the (absolute or relative) path, on the local operating system, to the location of color profile files.

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```
\pdfxSetRGBcolorProfileDir{\path to RGB color profiles}  
\pdfxSetCMYKcolorProfileDir{\path to CMYK profiles}
```

On a Macintosh, there are various places where the color profiles may be found. One can use either a macro `\MacOSColordir` which expands into the path for system-provided profiles:

```
/System/Library/ColorSync/Profiles/
```

or the macro `\MacOSLibraryColordir` expanding to:

```
/Library/ColorSync/Profiles/
```

or `\AdobeMacOSdir` which expands into the path:

```
/Library/Application Support/Adobe/Color/Profiles/Recommended/
```

Under Windows an available macro is `\WindowsColordir` which expands to:

```
C:\Windows\System32\Spool\Drivers\Color/
```

being the common location for color profiles. Use these within the `.xmpdata` file as, e.g.,

```
\pdfxSetCMYKcolorProfileDir{\AdobeMacOSdir}
```

Authors may change the paths to suit their own circumstances, either *before* loading `pdfx.sty` or within the `.xmpdata` file.

PDF/A and PDF/E usually need an RGB profile, while PDF/X and PDF/VT require a CMYK profile. It is possible to use a CMYK profile with PDF/A or PDF/E by specifying `\setRGBcolorprofile{}{}{}{}` in the `.xmpdata` file. Beware however, that with PDF/A any coloured hyperlink annotations can cause a validation problem, as these are interpreted as RGB colours even when 4 components are given. This may be a bug in validators, as PDF specifies that the number of components should match the color space.

### 2.6.1. ‘Custom’ color spaces

It is also possible to specify ‘Custom’ color spaces, other than RGB or CMYK. Here is an example command `\viiIndigoTAC`, defined as follows:

```
%% Custom profile: 7C Indigo TAC370 (ColorLogic)  
\gdef\viiIndigoTAC{\let\CallasMacOSpdfaPilotdir  
  \setCUSTOMcolorprofile  
    {7C Indigo_TAC370_ColorLogic.icc}\%  
    {\CallasProfilesdir}\%  
    {7C Indigo TAC370 \string\{ColorLogic\string\}}\% /ProfileName  
    {http://www.colorlogic.de}\% /RegistryName  
    {7CLR}\% number of colors specifier  
    {02400000}\% ICC version  
    {/Cyan /Magenta /Yellow /Black /Orange /Green /Violet}\% colour names  
    {48110b8b410ee6be015f3932c3167869}\% CheckSum  
  }\%
```

which uses a profile that accompanies the `pdfaPilot` software from Callas Software GmbH [5]. The macro `\CallasMacOSpdfaPilotdir`, defined in the file `CallasColorProfiles.tex`, specifies the directory where this Custom profile is located, when installed under MacOS. One



needs to `\input CallasColorProfiles.tex` *before* loading the pdfx package. Macros for other directories are also defined in this file.

## 2.7. Notes on the internal representation of metadata

Within the PDF file, metadata is deposited in two places: some data goes into the native PDF /Info dictionary, and some data goes into an XMP packet stored separately within the file. XMP is Adobe's Extensible Metadata Platform [2, 15], and is an XML-based format. See [Adobe XMP Development Center](#) for more exhaustive information about XMP. An XMP Toolkit SDK which supports the GNU/Linux, Macintosh and Windows operating systems is also available under modified BSD licence.

Some of the metadata, such as the author, title, and keywords, can be stored *both* in the XMP packet and in the /Info dictionary. For the resulting file to be standards-compliant, the two copies of the data must be identical. This is taken care of automatically by the pdfx package, except when `\sep` is used to handle multiple entries, as discussed above in §2.4.1. In such cases the string is not included within the /Info dictionary. Note that this is in accordance with the PDF 2.0 specification [21], which deprecates use of the /Info dictionary for such metadata.

In principle, users can resort to alternate ways to create an XMP file for inclusion in PDF. In this case, one should create a customised template file `pdfa.xmp` or `pdfx.xmp` or `pdfc.xmp` (etc., depending on the PDF flavor) containing the pre-defined data. This can be done by modifying the ones supplied with the pdfx package. However, this is an error-prone process and is *not* recommended for most users. If there is a particular field of metadata that you need and that is not currently supported, please contact the package authors.

pdfx makes use of the `xmpincl` package to include XMP data into the PDF. The documentation of `xmpincl` package may help interested users to understand the process of XMP data inclusion.

## 2.8. Tutorials and technical notes

A tutorial with step-by-step instructions for generating PDF/A files can be found at: <http://www.mathstat.dal.ca/~selinger/pdfa/>.

Some technical notes about production problems the authors have encountered while generating PDF/A compliant documents are available here: [http://support.river-valley.com/wiki/index.php?title=Generating\\_PDF/A\\_compliant\\_PDFs\\_from\\_pdftex](http://support.river-valley.com/wiki/index.php?title=Generating_PDF/A_compliant_PDFs_from_pdftex).

## 3. Installing

The pdfx.dtx package is available on CTAN as usual, via <http://ctan.org/pkg/pdfx>. It is also included in T<sub>E</sub>X distributions such as MacT<sub>E</sub>X, T<sub>E</sub>X Live and MiK<sub>T</sub>E<sub>X</sub>. Thus most users will not need to handle installation at all.

For those wishing to do a manual installation, here are some notes. The file pdfx.dtx is a composite document of program code and documentation in L<sup>A</sup>T<sub>E</sub>X format, in the tradition of *literate programming*. After having installed the package, to get the documentation that you are reading now, run (PDF)L<sup>A</sup>T<sub>E</sub>X on the file pdfx.dtx. The resulting PDF should be valid as PDF/A-2u. Or better, use the included Makefile, which will also regenerate the index.

To install the package, first extract the program code; i.e., the file pdfx.sty, by running L<sup>A</sup>T<sub>E</sub>X or T<sub>E</sub>X on the file pdfx.ins. Create a directory named pdfx under \$TEXMF/tex/latex and copy the files pdfx.sty, 8bit.def, glyphtounicode-cmr.tex, glyphtounicode-ntx.tex as well as the other \*.tex, l8u\*-penc.def and \*.xmp files, into it. Then update T<sub>E</sub>X's file database using the appropriate command for your distribution and operating system (such as `texhash` or `mktextlsr`, or similar).

## 3.1. Limitations and dependencies

The pdfx.sty package works with pdfTeX and also LuaTeX and XeTeX with some minor limitations. It further depends on the following other packages.

1. xmpincl for insertion of metadata into PDF.
2. inputenc to establish input-encoding infrastructure — see Section 4.2.
3. hyperref for ensuring data is correctly encoded when being written into the PDF file, and supporting features such as hyperlinking, bookmarks, etc.
4. xcolor for ensuring consistent use of the color model appropriate the PDF variant, within text and hyperlinks (when allowed).
5. glyphtounicode.tex (not XeTeX) maps glyph names to corresponding Unicode code-points.
6. ifluatex allowing coding specific to LuaTeX.
7. ifxetex allowing coding specific to XeTeX.
8. luatex85 or pdftexcmds (LuaTeX only) for access to primitive commands using pdfTeX macro names.
9. stringenc used to help generate proper bookmarks with transliterated input; e.g., with \textLGR or \textARM — see Section 4.1.4.

Other files and packages are loaded as sub-packages or as configuration files for these. Since some of these packages may be loaded by existing documents we provide here advice on how to deal with potential loading and option conflicts.

Firstly, it is best if pdfx is the first package loaded; e.g., directly after the \documentclass line. This is not a strict requirement, but it is worthwhile to deal with the metadata at the top of your TeX source, allowing correct options to be loaded to cope with validation aspects.

Secondly, replace \usepackage[<options>]{hyperref} with \hypersetup{<options>}. This deals with most loading issues with the hyperref package. Note that PDF/X is a format intended for printing. It forbids inclusion of hyperlinks and other actions, including via bookmarks. To produce a validating PDF/X document, pdfx overrides internal macros while keeping colors associated with link anchors. To inhibit these colors also, you could specify options as follows.

```
\hypersetup{colorlinks,allcolors=black}
```

Furthermore, options to set metadata components (such as pdfauthor, pdftitle, pdfsubject, pdfkeywords, etc.) are disabled, since pdfx has already taken care of this information.

Thirdly, conflicts with other packages may be dealt with by simply changing \usepackage to \RequirePackage within the document's preamble. But this may not be possible when the \usepackage or \RequirePackage command occurs within another package, or with a specific set of options, thereby causing processing to stop. Few packages have a command analogous to \hypersetup. Instead \PassOptionsToPackage{<options>}{<package>} can help. For <options> specify the ones associated with the loading yet to come. This can give a smooth processing run, but you'll need to check whether the results from those options have actually taken effect. Some examples of this can be seen later, in Figures 2 and 8.

### 3.1.1. Limitations using XeTeX

To process a file using XeTeX, to produce a document that can validate to a particular PDF standard, one need to use a command to run the TeX engine, as follows.

```
xelatex -shell-escape -output-driver="xdvipdfmx -z 0" <filename>.tex
```

The `-shell-escape` option allows a command-line task to be run, which writes the creation date & time of the running job into a small file on disk. This data, written in a specific format, is then read by the job for inclusion into several metadata fields. This emulates the result of pdfT<sub>E</sub>X's `\pdfcreationdate` primitive. As there are security implications in allowing arbitrary commands to be run, this need for `-shell-escape` must be viewed as imposing a limitation on the work-flows in which this can be safely used.

The `-output-driver="xdvipdfmx -z 0"` suppresses compression, which is not allowed for the XMP metadata packet. Without this, the resulting PDF may fail to pass validation tests.

XeT<sub>E</sub>X is designed for processing UTF-8 input only. When presented with a T<sub>E</sub>X source using a legacy encoding, such as `latin2` or `koi8-r`, the input is accepted and a PDF produced. Yet there will be garbage characters corresponding to each character entered from the upper range (128–255). This is evident in the PDF content and bookmarks; yet pdfx produces the correct XMP metadata packet. So while the techniques explained later in Section 4.1 are valid, the PDF itself does not contain correct content.

Not all fonts, in particular Open-Type fonts (OTF), naturally come with mappings of the glyphs to Unicode code points. This is a requirement with PDF/A and PDF/E standards. Use of such fonts can result in validation errors, such as:

- CIDset in subset font is incomplete (font contains glyphs that are not listed).
- Type 2 CID font: CIDToGID map is invalid or missing.

If one has access to Adobe's Acrobat Pro software, then its Preflight utility can rewrite the uncompressed output from XeT<sub>E</sub>X into a valid PDF standard, using compression of the contents but not of the XMP packet. Similarly Preflight can fix the missing font information.

### 3.1.2. Limitations using LuaT<sub>E</sub>X

LuaT<sub>E</sub>X can handle the OTF font issues mentioned for XeT<sub>E</sub>X, so can produce valid PDF/A documents where XeT<sub>E</sub>X fails. However, since LuaT<sub>E</sub>X expects all input source to be UTF-8-encoded, it cannot work at all with documents using older legacy encodings. Instead one gets error messages such as:

```
! String contains an invalid utf-8 sequence.
1.5 \Copyright{\textLIII{UWAGA dla recenzent
                                     iżew/tâiumaczy}}
?
```

from a document using `latin2` encoded characters. Thus most of Section 4.1 is just not applicable for LuaT<sub>E</sub>X, whereas it is for pdfT<sub>E</sub>X. This is essentially the same problem as described above for XeT<sub>E</sub>X, but here LuaT<sub>E</sub>X advises that there are problems as soon as it encounters an invalid (for UTF-8) character. Some would regard this as better than having the job run to completion, only to later discover garbage content within the PDF.

## 3.2. Files included

The following files are included in the package. Some can be created from `pdfx.dtx`, using the `Makefile`.

### 3.2.1. Package files

- `pdfx.sty` — main package file generated from `pdfx.dtx`.

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- pdfa.xmp — specimen xmp template for PDF/A.
- pdfe.xmp — specimen xmp template for PDF/E.
- pdfvt.xmp — specimen xmp template for PDF/VT.
- pdfx.xmp — specimen xmp template for PDF/X.
- 8bit.def — custom input encoding.
- 18u-penc.def — input encoding macro declarations.
- 18uarb-penc.def — input macro declarations for Arabic.
- 18uarm-penc.def — input macro declarations for Armenian.
- armglyphs.dfu — Unicode mapping for Armenian letters.
- 18ucyr-penc.def — input macro declarations for Cyrillic alphabet.
- 18udev-penc.def — input macro declarations for Devanagari.
- 18ugrk-penc.def — input macro declarations for Greek alphabet.
- 18uheb-penc.def — input macro declarations for Hebrew alphabet.
- 18ulat-penc.def — input macro declarations for Latin 1–9 encodings.
- 18umath-penc.def — input macro declarations for mathematical symbols.
- glyphtounicode-cmr.tex, glyphtounicode-ntx.tex — maps glyph names to corresponding Unicode for Computer Modern and other T<sub>E</sub>X-specific fonts.
- AdobeColorProfiles.tex — macros for inclusion of Adobe-supplied color profiles.
- AdobeExternalProfiles.tex — macros for use of external color profiles.
- CallasColorProfiles.tex — macros for profiles included with Callas pdfaPilot software.

### 3.2.2. Documentation & Examples

- README — usual top-level information.
- manifest.txt — file list.
- pdfx.pdf — package documentation.
- sample.tex, sample.xmpdata — a sample file with sample metadata.
- small2e-pdfx.tex — sample file with included metadata.

### 3.2.3. Sources

- src/pdfx.dtx — composite package and documentation.
- src/pdfx.ins — installer batch file.
- src/pdfx.xmpdata — metadata for the documentation.
- src/rvdtx.sty — used by pdfx.dtx.
- src/Makefile — a Makefile for building the documentation.
- src/MANIFEST — list of files in this directory.
- src/text89.def — used with Figure 13 in the documentation.
- src/{arm-start,koi8-example,koi8-example2,latin2-example}.tex — used in the documentation with figures showing example coding.
- src/{TL-POL-meta,TL-RU-LICRs,TL-RU-metadata,TL-RU-toc,Armenian-example-UTF8,armtex-meta,usage-meta,math-assign5}.png — screenshot images showing multilingual and other metadata.

### 3.3. Miscellaneous information

The package is released under the L<sup>A</sup>T<sub>E</sub>X Project Public Licence. Bug reports, suggestions, feature requests, etc., may be sent to the original authors at [cvr@river-valley.org](mailto:cvr@river-valley.org) and/or [thanh@river-valley.org](mailto:thanh@river-valley.org), or to the more recent contributors at [ross.moore@mq.edu.au](mailto:ross.moore@mq.edu.au) and/or [selinger@mathstat.dal.ca](mailto:selinger@mathstat.dal.ca).

## 4. Multilingual and Technical Considerations

T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X have an on-going practice of including metadata within the source files and package documentation. Usually this is done as comments at the beginning of the file; such as the following from the English language version of the 2015 T<sub>E</sub>X Live documentation<sup>5</sup>.

```
%Id: texlive-en.tex 37205 2015-05-05 21:36:33Z karl $
%TeX Live documentation. Originally written by Sebastian Rahtz and
%Michel Goossens, now maintained by Karl Berry and others.
%Public domain.
```

This provides information, ideally suited for copyright metadata fields, as in Section 2.3.2, as well as for \Subject and \CoverDate from Section 2.3.4.

Also near the top of the file one finds front-matter content

```
%\title{%
%  {\huge \textit{The \TeX\ Live Guide---2015}}
%}
%\author{Karl Berry, editor \[\[3mm]
%  \url{http://tug.org/texlive/}
%}
%\date{May 2015}
```

which supplies metadata information for the commands \Title, \Author, \CoverDisplayDate also from Section 2.3.4, and \CopyrightURL.

Most of the hundreds of thousands, if not millions of documents prepared using T<sub>E</sub>X, L<sup>A</sup>T<sub>E</sub>X and other T<sub>E</sub>X-based formats, include similar metadata information, much of which currently does not accompany the resulting PDF. It is becoming increasingly common, if not yet a legal requirement, for PDFs to satisfy a standard that requires inclusion of metadata. This is especially so for government agencies and institutions receiving government funding, in several countries around the world.

It is an aim of the pdfx to simplify the process of capturing and including metadata within L<sup>A</sup>T<sub>E</sub>X-produced PDFs, from both the author's view and that of archivists. The extra features introduced with version 1.5.8 take a large step in that direction. This includes the ability, described in the next subsection, to reliably include data presented in different text encodings, rather than being restricted to UTF-8 only. It is a role of the software to make the conversion, rather than rely on some 3rd party for a translation.

### 4.1. Multilingual Metadata

A cursory search of the documentation (.../texmf-dist/doc) subtree of the forthcoming T<sub>E</sub>X Live 2016 release reveals more than 730 different .tex or .dtx document sources which specify an input encoding, via the \usepackage[...]{inputenc} command. Roughly 380 (a bit more than half) declare UTF-8 as the input encoding. Of the remainder there are ≈ 20 other encodings specified, covering a range of languages for at least part of their content. At some

<sup>5</sup> found at /usr/local/texlive/2016/texmf-dist/doc/texlive/texlive-en/.

point in time, these documents may be required to have accurate accompanying metadata, as part of conformance to a designated PDF (or other) standard. There are libraries and archives that already must meet such standards.

We have shown above, in Section 2.2, how the `.xmldata` file can be inserted into the document source, which then ensures that metadata is reliably transferred along with the source itself. This seems a good strategy, but are there any problems with it, especially in a multilingual context?

Modern editing software can require an encoding to be associated with each file. This is what allows the correct characters to be shown, from what is otherwise just a sequence of 8-bit bytes. The flip-side is that arbitrary editing is not permitted. Add some UTF-8 data into a file that is encoded as Latin-2 then try to save it. You may be asked to specify a new encoding, or the application may even crash out entirely. Maybe this happens *accidentally*. It is not hard for a curly quote (') or endash (–) to be included; many editors have settings which can do this with normal ascii input. Turn *off* such settings.

The approach that we advocate is that when editing to add metadata, best is to:

1. use the *same encoding* as is specified for the file itself, if known (as is usually the case);
2. even if 1. is not possible, use Copy/Paste *within* the document source (e.g., for authors' names, addresses, affiliations, etc.) and from comments, as in Section 4 above;
3. avoid typing new characters, especially quotes and dashes, and be extra careful with back-spacing to preserve the real meaning of copied content.

Even if the original encoding is not known, use of Copy/Paste from other parts of the document is normally not going to change its encoding. This should not cause the file to become invalid due to mixed content. In some situations it may be necessary to use an ASCII-only representation, such as L<sup>A</sup>T<sub>E</sub>X's LICR<sup>6</sup> macros [22, § 7.11].

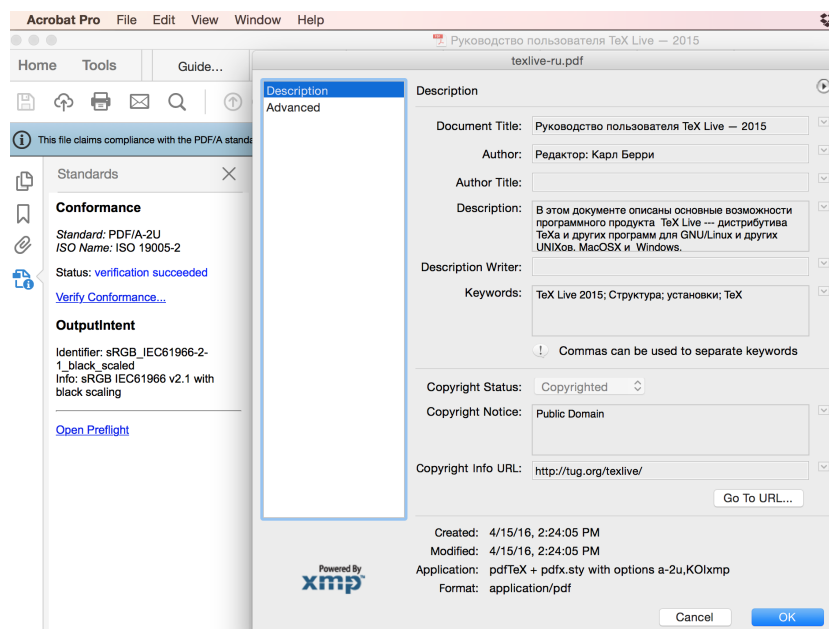


Figure 1: Metadata generated from the coding shown in Figure 2, viewed using Acrobat Pro's 'Additional Metadata ...' panel.

<sup>6</sup>LICR: L<sup>A</sup>T<sub>E</sub>X Internal Character Representation; or think 'I = Interchange'.



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```
% $Id: texlive-ru.tex 34060 2014-05-16 19:52:41Z boris $
%
%\def\Status{1}
\providecommand{\pdfxopts}{a-2u,KOIxmp}
\providecommand{\thisyear}{2015}
%\immediate\write18{rm \jobname.xmpdata}%  uncomment for Unix-based systems
\begin{filecontents*}{\jobname.xmpdata}
\Title{\textKOI{òÕËÏËÏÄÓÔËÏ ðÏÏØÛÏÄÓÄÏÑ} TeX Live \textemdash \thisyear}
\Author{\textKOI{äÄÄÄËÖÏÖ: ëÄÖÏ äÄÖÖË}}
\Subject{\textKOI{æ ÜÖÏÏ ÄÏËÖÏÄÏÖÄ ÌðÉÓÄÏÜ ÍÓÏËÏÜÄ æÏÛÏÖÏÏÖÖË ðÖÏÇÖÄÍÏÏÇÏ ðÖÏÄÖËÖÄ }
TeX Live \textKOI{--- ÄÉÖÖÖÉÄÖÖËÉÁ }TeX\textKOI{Á É ÄÖÖÇËË ðÖÏÇÖÄÍÏ ÄÏÑ} GNU/Linux
\textKOI{É ÄÖÖÇËË }UNIX\textKOI{ÏË}, MacOSX\textKOI{ É Windows.}}
\Keywords{TeX Live \thisyear\sep \textKOI{óÖÖÖËÖÖÖÄ}\sep \textKOI{ÖÖÖÄÏÏËËË}\sep \TeX}
\CoverDisplayDate{\textKOI{íÁË} \thisyear}
\CoverDate{2015-05-06}
\Copyrighted{False}
\Copyright{Public Domain}
\CopyrightURL{http://tug.org/texlive/}
\Creator{pdfTeX + pdfx.sty with options \pdfxopts }
\end{filecontents*}
\documentclass{article}
\usepackage[\pdfxopts]{pdfx}[2016/03/09]
\PassOptionsToPackage{obeyspaces}{url}
\let\tldocrussian=1 % for live4ht.cfg
\usepackage{cmap}
\usepackage{tex-live}
\usepackage[koi8-r]{inputenc}
\usepackage[russian]{babel}
...
\begin{document}
\title{%
  {\huge \textit{òÕËÏËÏÄÓÔËÏ ðÏÏØÛÏÄÓÄÏÑ \protect\TL{} "--- \thisyear}}}%
}
\author{äÄÄÄËÖÏÖ: ëÄÖÏ äÄÖÖË\[\[3mm]
  \url{http://tug.org/texlive/}}
\date{íÁË \thisyear}
```

Figure 2: Example of cyrillics in metadata, shown as if T1-encoded. See Figure 1 for the actual result.

#### 4.1.1. Metadata with Cyrillics

Here is a ‘real-world’ example, with Figure 1 showing the metadata as could be produced for the Russian language version of the T<sub>E</sub>X Live documentation, from coding as shown in Figure 2. The source file itself is actually encoded for KOI8-R, as indicated by the presence of the code line `\usepackage[koi8-r]{inputenc}`, but is deliberately shown here encoded as T1 [22, p. 449]. This difference is immaterial for checking the validity of the metadata. For example, the stream of upper (accents, etc.) characters within `\Title{\textKOI{ ... }}` is the same as within `\title{... \textit{ ... }}`. Similarly for `\Author{\textKOI{...}}` and `\author{...}`, and `\CoverDate` and `\date`. Strings for the `\Subject` and `\Keywords` are taken from the first actual paragraph in the document, and from early subsection titles.

It is the ‘parser’ command/macro `\textKOI{ ... }` that indicates that the upper range characters (having byte codes 128–255) are to be treated as KOI8-R characters, rather than as part of UTF-8 byte sequences. It works by examining each byte in sequence, and returning the

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appropriate UTF-8 2-byte sequence for the required cyrillic character. This happens during the processing of data from `\jobname.xmpdata` for fleshing-out the XMP metadata packet to be included within the final PDF/A document.

The ‘parser’ macros defined for various encodings, are given in Figure 3. In Section 2.1.7 the package options are given for loading the appropriate support for desired languages or alphabets. Support for other encodings can be added, if there proves to be a need.

macro	encodings	bytes 128–255 with languages
<code>\textLAT</code>	Latin-1	Western European
<code>\textLII</code>	Latin-2	Middle European
<code>\textLIII</code>	Latin-3	South European
<code>\textLIV</code>	Latin-4	North European
<code>\textLTV</code>	Latin-5	Turkish
<code>\textLVI</code>	Latin-6	Nordic
<code>\textLVII</code>	Latin-7	Baltic Rim
<code>\textLIIIX</code>	Latin-8	Celtic
<code>\textLIX</code>	Latin-9	Western European, incl. €
<code>\textKOI</code>	KOI8-R, KOI8-RU	cyrillic alphabets
<code>\textLGR</code>	LGR, ISO-8859-7	Greek & Polytonic Greek
<code>\textARM</code>	ArmT <sub>E</sub> X, ArmSCII8	Armenian
<code>\textHEB</code>	HE8, ISO-8859-8, CP1255	Hebrew
<code>\textHEBO</code>	CP862	Hebrew
<code>\(...\)</code>	parses simple mathematical expressions	

Figure 3: Parser macros, defined for specific types of input.

```
(/usr/local/texlive/2014/texmf-dist/tex/latex/oberdiek/grfext.sty)
(/usr/local/texlive/2014/texmf-dist/tex/latex/latexconfig/epstopdf-sys.cfg)
> \LICRs=macro:
->\IeC {\CYRR} \IeC {\cyru} \IeC {\cyrk} \IeC {\cyro} \IeC {\cyrv} \IeC {\cyro}
\IeC {\cyrd} \IeC {\cyrs} \IeC {\cyrt} \IeC {\cyrv} \IeC {\cyro} \IeC {\cyrp}
\IeC {\cyro} \IeC {\cyrk} \IeC {\cyrstsn} \IeC {\cyrz} \IeC {\cyro} \IeC {\cyrp}
rv \IeC {\cyra} \IeC {\cyrt} \IeC {\cyre} \IeC {\cyrk} \IeC {\cyrz} \IeC {\cyra} \protect
\TL {} "---- 2015.
\showLICRs ...otect \edef \LICRs {#1}\show \LICRs
\endgroup
1.45 ...???? ?????????? \protect\TL{} "---- 2015}
? █
43 \begin{document}
44
45 \showLICRs(Руководство пользователя \protect\TL{} "---- 2015)
46 \title{%
47 \huge \textit{Руководство пользователя \protect\TL{} "---- 2015}}%
48 }
49
50 \author{Редактор: Карл Берри\3mm}
51 \url{http://tuo.ora/texlive/}
```

Figure 4: How to see LICRs in the .log window.

With encoded characters marked in this way with a ‘parser’ macro, it is actually possible to mix UTF-8 metadata with other bytes; provided, of course, you have an editor that allows such a file to be created and saved. On the other hand, if you are unhappy with mixing content having different encodings, then there is another way, based upon T<sub>E</sub>X’s LICR macros [22, § 7.11] for representing accented and non-latin characters. These are normally hidden away (‘I = Internal’) but in fact can be seen within auxiliary files, such as `.aux` and `.toc`, `.lof` and `.lot`. This is how T<sub>E</sub>X stores the knowledge of such characters for use in a part of the

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document processing which may not have the same encoding as the document as a whole, or may require characters generated using several different encodings. Thus LICRs allow for a reliable representation passed to a different context; think ‘I = Interchange’.

```
% $Id: texlive-ru.tex 34060 2014-05-16 19:52:41Z boris $
%
%\def\Status{1}
\providecommand{\pdfxopts}{a-2u,KOIxmp}
\providecommand{\thisyear}{2015}
%\immediate\write18{rm \jobname.xmpdata}%  uncomment for Unix-based systems
\begin{filecontents*}{\jobname.xmpdata}
\Title{\IeC {\CYRR } \IeC {\cyru } \IeC {\cyrk } \IeC {\cyro } \IeC {\cyrv } \IeC {\cyro }
 \IeC {\cyrd } \IeC {\cyrS } \IeC {\cyrt } \IeC {\cyrv } \IeC {\cyro } \IeC {\cyrp } \IeC {\cyro }
 \IeC {\cyrI } \IeC {\cyrSftsn } \IeC {\cyrz } \IeC {\cyro } \IeC {\cyrv } \IeC {\cyra } \IeC {\cyrt }
 \IeC {\cyre } \IeC {\cyrI } \IeC {\cyrya } TeX Live \textemdash \thisyear}
\Author{\IeC {\CYRR } \IeC {\cyre } \IeC {\cyrd } \IeC {\cyra } \IeC {\cyrk } \IeC {\cyrt }
 \IeC {\cyro } \IeC {\cyrr } : \IeC {\CYRK } \IeC {\cyra } \IeC {\cyrr } \IeC {\cyrI }
 \IeC {\CYRB } \IeC {\cyre } \IeC {\cyrr } \IeC {\cyrr } \IeC {\cyri } }
\Keywords{TeX Live \thisyear\sep \IeC {\CYRS } \IeC {\cyrt } \IeC {\cyrr } \IeC {\cyru }
 \IeC {\cyrk } \IeC {\cyrt } \IeC {\cyru } \IeC {\cyrr } \IeC {\cyra } \sep \IeC {\cyru }
 \IeC {\cyrS } \IeC {\cyrt } \IeC {\cyra } \IeC {\cyrn } \IeC {\cyro } \IeC {\cyrv } \IeC {\cyrk }
 \IeC {\cyri } \sep TeX}
\Subject{\IeC {\CYRV } \IeC {\cyrrrev } \IeC {\cyrt } \IeC {\cyro } \IeC {\cyrm } \IeC {\cyrd }
 \IeC {\cyro } \IeC {\cyrk } \IeC {\cyru } ...
...
\CoverDisplayDate{\IeC {\CYRM } \IeC {\cyra } \IeC {\cyrishrt } 2015}
\CoverDate{2015-05-06}
\Copyrighted{False}
```

Figure 5: Example of cyrillics in metadata, using LICRs.

```
43 \begin{document}
44
45 \addcontentsline{toc}{title}{Руководство пользователя \protect\TL{} "---- 2015}
46 \title{\%
47 {\huge \textit{Руководство пользователя \protect\TL{} "---- 2015}}}%
48 }
49 \addcontentsline{toc}{author}{Редактор: Карл Берри}
50 \author{Редактор: Карл Берри\{3mm}
51 \url{http://tug.org/texlive/}
52 \date{Май \thisyear}
53 \addcontentsline{toc}{date}{Май \thisyear}
54 \addcontentsline{toc}{docs}{Структура}
55 \addcontentsline{toc}{install}{установки}
56 \addcontentsline{toc}{Subject}{В этом документе описаны основные возможности программного продукта
57 \TL{} "---- дистрибутива \TeX{}а и других программ для \acro{GNU}/Linux и других UNIXов, \MacOSX и Windows.}
58 \maketitle
59
```

Figure 6: How to get desired LICRs into the .toc file.

Figure 4 shows how to see this. The document source in the lower portion clearly shows the cyrillic input, whereas the .log messages in a command-line window above reveal the LICR representation. A command `\showLICRs` is available with pdfx.sty version 1.5.8, specifically to allow this. Now the LICR representation can be copied directly from the .log file, modulo slight difficulties due to the way long lines are broken. As this representation is entirely with ASCII characters, it should not cause any conflict with any UTF-8 metadata that you want within the same file. The .xmpdata file might now look as in Figure 5. Although very verbose,

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this should be resistant to any corruption due to character encodings, and produces the same result within the PDF, as in Figure 1.

Alternatively one can exploit the `.toc` file, using T<sub>E</sub>X’s command `\addtocontents`, as shown in Figure 6. After processing the file, you can copy the LICR representations out of the `.toc` file, taking care to remove anything of a non-character nature (e.g., implementing the size and spacing of the letters in T<sub>E</sub>X).

Of course once you have harvested the metadata in this format, remove or comment-out those extra `\showLICRs` to get uninterrupted processing. Similarly comment-out the extra `\addtocontents` lines, else the real Table-of-Contents will become corrupted with unwanted entries. A couple more T<sub>E</sub>X processing runs should restore the PDF to the way you want it.

#### 4.1.2. Metadata with Polish

The next example has upper-range bytes intended to represent Latin-2 encoded characters, as used in Polish. With the T<sub>E</sub>X source starting as in Figure 8, the resulting metadata is shown in Figure 7.

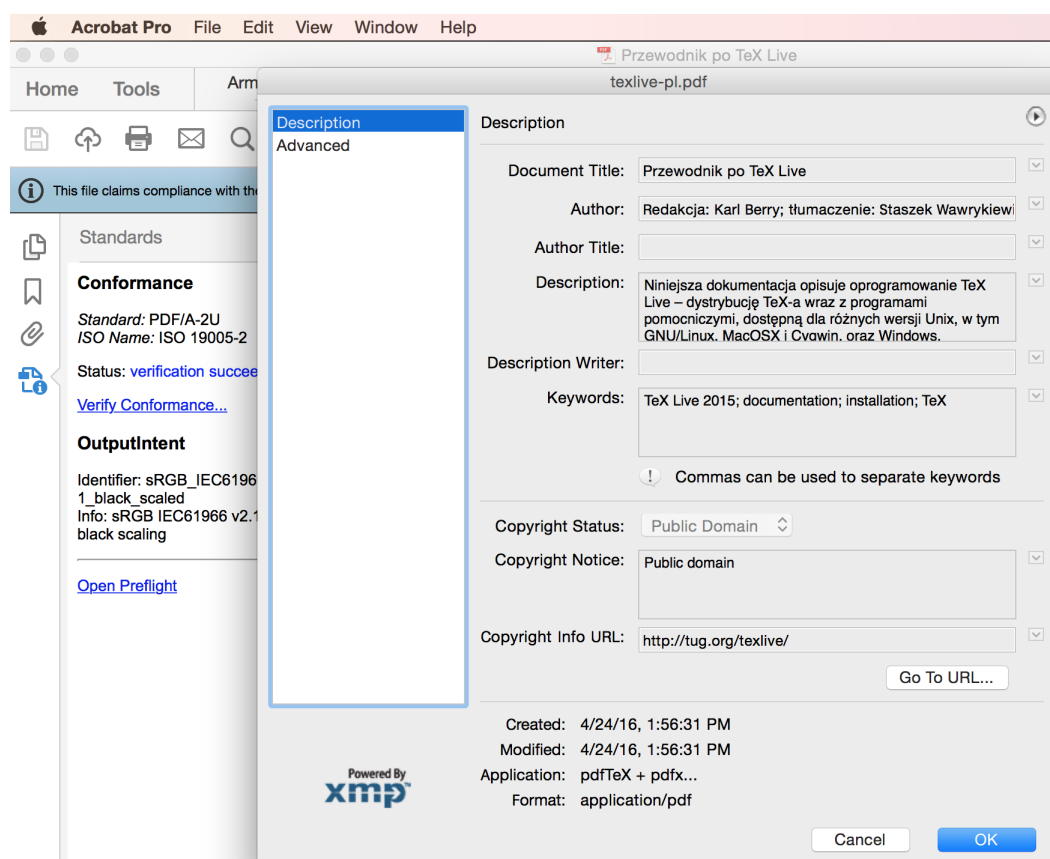


Figure 7: Metadata generated from the coding shown in Figure 8 for the Polish version of T<sub>E</sub>X Live 2015 documentation, showing Latin-2 encoded characters. The document is valid for PDF/A-2, after having been processed with pdfT<sub>E</sub>X.

Here the ‘parser macro’ is `\textLII`, which can be seen in Figure 8 to surround either complete metadata entries, or just those parts containing polish accented (or other) characters in entries that also contain english words. The macro `\textLF` provides a line-feed character for the UTF-8 output.

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```
% iso8859-2
% $Id: texlive-pl.tex, v. 53 2015/05/17
% TeX Live documentation.
% Originally written by Sebastian Rahtz and Michel Goossens,
% now maintained by Karl Berry and others.
% Polish translation and additions by Staszek Wawrykiewicz
% (with a little help from my friends, while my guitar gently weeps ;-))
% Public domain.
% ----
% UWAGA dla recenzentów/tłumaczy: %! to moje komentarze (StaW)
%
\providecommand{\pdfxopts}{a-2u,LATxmp}
\providecommand{\thisyear}{2015}
\begin{filecontents*}{\jobname.xmpdata}
\Title{Przewodnik po TeX Live \thisyear}
\Author{Redakcja: Karl Berry\sep \textLII{tłumaczenie: Staszek Wawrykiewicz}}
\Subject{\textLII{Niniejsza dokumentacja opisuje oprogramowanie \TeX\ Live
-- dystrybucję \TeX-a wraz z~programami pomocniczymi, dostępna dla różnych wersji Unix,
w~tym GNU/Linux, MacOSX i~Cygwin, oraz Windows.}\textLF\textLF Documentation originally
written by Sebastian Rahtz and Michel Goossens, now maintained by Karl Berry and others.}
\Keywords{TeX Live \thisyear\sep documentation\sep installation\sep \TeX}
\Copyright{Public domain}\Copyrighted{False}
\CopyrightURL{http://tug.org/texlive/}
\CoverDisplayDate{Maj \thisyear}
\CoverDate{\thisyear-05-17}
\Creator{pdfTeX + pdfx.sty with options \pdfxopts, from TeX Live 2016}
\end{filecontents*}
%
\documentclass{article}
\let\tldocenglish=0 % for live4ht.cfg
\let\textsl\textit
\usepackage[\pdfxopts]{pdfx}[2016/04/13]
\PassOptionsToPackage{obeyspaces}{url}
\PassOptionsToPackage{breaklinks,colorlinks,linkcolor=hypercolor,citecolor=hypercolor,%
urlcolor=hypercolor,filecolor=hypercolor,bookmarksopen,hyperindex}{hyperref}
\hypersetup{breaklinks,colorlinks,allcolors=hypercolor}
\usepackage{tex-live}
\usepackage{polski} % for PL
\usepackage[latin2]{inputenc} % for PL
\usepackage[T1]{fontenc}
...
\begin{document}
\title{\huge \textit{Przewodnik po \protect\TL{ } 2015}}
\author{Redakcja: Karl Berry; tłumaczenie: Staszek Wawrykiewicz \ll[3mm]
\url{http://tug.org/texlive/}}
\date{Maj 2015}
```

Figure 8: Start of the  $\text{\TeX}$  source for the Polish version of  $\text{\TeX}$  Live documentation. Although Latin-2 encoded, the bytes are shown here using  $\text{\TeX}$ ’s T1 encoding [22, p. 449].

As a technical note, the `\jobname.xmpdata` file is read with `\obeyspaces` in effect. This causes space runs in the input to be replaced by a single ‘active space’ character, which ultimately expands into a normal space upon output. This is needed to preserve inter-word spaces, which would otherwise get lost during parsing, due to  $\text{\TeX}$ ’s pattern matching when reading

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macro arguments. Each byte is examined individually, with normal letters a–zA–Z and most punctuation characters passed through unchanged.

Let’s understand better how this example was created. There are three files involved.

- `pdfx.dtx`, the source for this documentation, open in an editor with encoding declared as UTF-8;
- `texlive-pl.tex` the Polish documentation for T<sub>E</sub>X Live, open in the same editor with Latin-2 encoding;
- `latin2-example.tex` which starts life as an empty file on disk.

This latter file must be opened in the editor, with encoding declared as Latin-2 (ISO-8859-2). Next the preamble is copied from `texlive-pl.tex` and pasted into `latin2-example.tex` which is then saved to disk. Further editing is done to `latin2-example.tex` to add verbatim markers (`|...|`) and adjust line lengths for display within Figure 8. This file’s contents is included as part of the documentation via `\input{latin2-example}` within an environment that handles presentation aspects, and (since 2018) declares `\UseRawInputEncoding`.

What *cannot* be done is to paste the preamble content directly into `pdfx.dtx`. Consider what would then happen, using ‘`thumaczy`’ (‘translators’, on line 10 following ‘UWAGA’). This word shows correctly in the Latin-2 encoded files. It was typeset here using `\l` for the ‘l’ letter, having Unicode code-point `Ux0142` (so UTF-8 byte pair “C5”82). However, it occurs at slot “B3 within Latin-2 encoding. In the T1 font encoding [22, p. 449] the character glyph name for slot “B3 is `/scedilla`, which is what shows in Figure 8. When the ‘l’ is pasted directly into a UTF-8 file and shown verbatim, the result is the pair of glyphs “C5 (`/Aring`) and “82 (`/Cacute`); viz. `tÂĆumaczy`.

As with Figure 2 it is not important that the correct characters are shown here, but that the metadata in `\jobname.xmpdata` corresponds to what is used on the titlepage of the PDF; e.g., the contents of `\Title` and `\title`, `\Author` and `\author`, etc.

### 4.1.3. Metadata with Greek

Prior to proper support for UTF-8 input, a method for preparing document source for the modern Greek language (and also for polytonic Greek), involved the use of LGR encoded fonts. Such a font has Greek (instead of Latin) letters in the slots for a–zA–Z, see [22, §9.4.2]. Thus ordinary ASCII letters are used to produce the Greek characters; the mapping of ASCII to Greek is referred to as a ‘transliteration’ scheme. It serves as *both* an input encoding, and as a font encoding. Accents and diacritic marks are provided through ligatures built-in to the fonts. Various documents can be found on the web<sup>7</sup> and within T<sub>E</sub>X Live distributions<sup>8</sup>.

Indeed the current maintainer Günther Milde states “The LGR transliteration does not work for PDF metadata”. This is because there is no translation of LGR input into T<sub>E</sub>X LICRs, as happens with say `\usepackage[utf8]{inputenc}` for UTF-8 input, or when upper 8-bit characters are present using `\usepackage[iso-8859-7]{inputenc}`. With these, LICRs such as `\textAlpha`, `\textOmicron`, ..., `\textomega` are produced, which result in the correct characters for metadata and bookmarks, perhaps employing Unicode ‘combining’ characters for accented letters. Using `pdfx` the UTF-8 characters can be put directly into the `.xmpdata` file; LICRs are interpreted provided the `grxmp` loading option has been specified.

Using the methods of `pdfx` the metadata difficulty is remedied, as can be seen in Figure 9 using coding as shown in Figure 10. This requires the `LGRxmp` option and `\textLGR` ‘parser’ macro. The original document source, called `usage.tex`, can be found in the directory specified in the footnote below. As this document is essentially an English description of how to use LGR for Greek, we have used the ‘Keywords’ field to provide examples of such usage. Since

<sup>7</sup>e.g., <http://milde.users.sourceforge.net/LGR/>

<sup>8</sup>TeXLive: `.../2016/texmf-dist/doc/generic/babel-greek/`



a macro `\textgreek` can be used for greek portions within such documents, this macro name is aliased to `\textLGR` within the context where metadata is processed. Furthermore, parsing using `\textLGR` generates correct pre-composed characters for letters with accents or diacritics. Bookmarks can also be generated from LGR input, using a technique described in Section 4.1.4.

The features available with different loading options are summarised here.

- no option: all metadata in `.xmpdata` file is in UTF-8 (incl. ASCII)
- `grkxmp`: LICRs can be present; e.g. `\textAlpha`, `\textOmega`, etc.
- `LGRxmp`: supports LGR-encoded input and ISO-8859-7 upper range characters, using the `\textLGR` ‘parser’ macro.

With `LGRxmp` specified, the features of `grkxmp` are also available; so any lower-listed option allows data to be mixed with that for higher-listed ones.

The final piece to get validation for PDF/A from LGR input, is to specify a Unicode point for the ‘v’ used only in the strong ‘sv’ ligature to obtain a non-final ‘sigma’ typeset in isolation.

```
\pdfglyphtounicode{internalchar2}{200D}
```

This gives an interpretation as ‘zero-width joiner’. There are two instances of this within `usage.tex`. Copy/Paste works as desired. Using pdfTeX the above command is done automatically. Drivers, such as XeTeX lacking an implementation of `\pdfglyphtounicode`, can fail to produce a valid PDF due to this rather minor deficiency.

Greek numerals, using `\greeknumeral` or `\Greeknnumeral` cannot work directly within a `.xmpdata` file. However if such is desired, the following technique allows correct LICRs to be

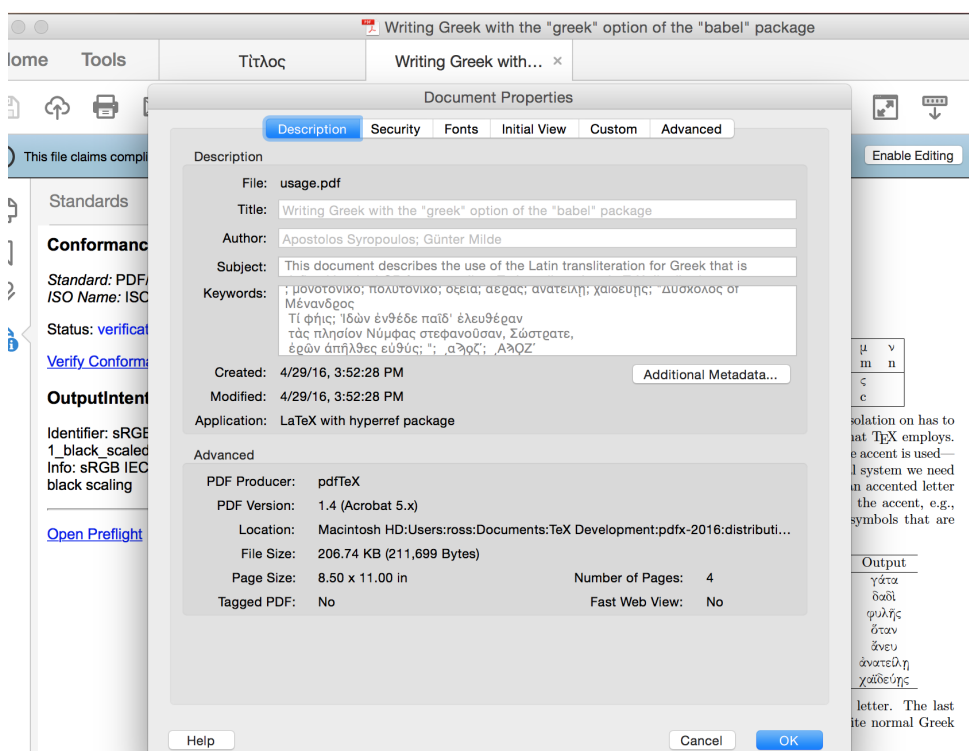


Figure 9: Metadata generated from the coding shown in Figure 10 using the greek language specified via the LGR encoding.

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
% ...
% This file is part of the Babel system.
% -----
%
% It may be distributed and/or modified under the
% conditions of the LaTeX Project Public License, either version 1.3
% ...
% The Current Maintainer of this work is Günter Milde.
% ...

\providecommand{\pdfxopts}{a-2u,LGRxmp,LATxmp}
\begin{filecontents*}{\jobname.xmpdata}
\Title{Writing Greek with the "greek" option of the "babel" package}
\Author{Apostolos Syropoulos\sep Günter Milde}
\Subject{This document describes the use of the Latin transliteration for Greek that is
defined by the LGR font encoding. Today, all modern LaTeX distributions support literal
input of Greek, which is the preferred method for new documents. [G. Milde 2013/12/02]}
\Keywords{\textLGR{monotonik'o}\sep \textLGR{polutonik'o}\sep \textgreek{oxe'ia} \sep
\textgreek{>a'erac}\sep \textgreek{>anate'ilh|}\sep \textgreek{qa'ide'uh|c}} \sep
\textgreek{D'uskoloc} of \textgreek{M'enandroc}\textLF \textLGR{T'i f'hic? <Id'wn
>enj'ede pa'id'' >eleuj'eran\textLF t'ac plhs'ion N'umfac stefano~usan, S'wstrate,
\textLF >er~wn 'ap~hljec e>uj'uc? \sep
\textaristerikeraia\textalpha\textsampi\textqoppa\textzeta\textdexiakeraia\sep
\textaristerikeraia\textAlpha\textSampi\textQoppa\textZeta\textdexiakeraia}}
\CoverDate{1997-10-15}
\CoverDisplayDate{October 15, 1997}
\Copyright{This file is part of the Babel system.\textLF This file may be distributed and/or
modified under the conditions of the LaTeX Project Public License, either version 1.3
of this license or (at your option) any later version.}
\CopyrightURL{http://www.latex-project.org/lppl.txt}
\end{filecontents*}
%
\documentclass[11pt]{article}
\usepackage[\pdfxopts]{pdfx}[2016/04/13]
\hypersetup{colorlinks,allcolors=blue}
\usepackage[american,greek]{babel}
\languageattribute{greek}{polutoniko}
\usepackage{athnum,grmath}
\newcommand{\sg}{\selectlanguage{greek}}
\newcommand{\sa}{\selectlanguage{american}}
\begin{document}
\selectlanguage{american}
\title{Writing Greek with the \ttfamily greek\rmfamily\ option of the
\ttfamily babel\rmfamily\ package}
\author{Apostolos Syropoulos\
...\\...}
\date{October 15, 1997}
\maketitle
\abstract{\noindent
This document describes the use of the Latin transliteration for Greek that
is defined by the LGR font encoding. Today, all modern LaTeX distributions
support literal input of Greek, which is the preferred method for new
documents. [G. Milde 2013/12/02]}
```

Figure 10: Start of enriched L<sup>A</sup>T<sub>E</sub>X source for a document describing how to typeset in Greek, with added metadata demonstrating the LGR transliteration encoding.

found for use in the metadata. At any convenient place within the  $\text{\LaTeX}$  source; e.g., near where the required number is used, insert coding such as:

---

```
{\pdfxGreeknumeralsHack \textgreek{\edef\num{\greeknumeral{1997}}\show\num}}%
```

---

Upon processing, the following will be written to the console or .log-window.

---

```
> \num=macro:
->\LGR\textaristerikeraia \LGR\textalpha \LGR\textsampi \let \protect \LGR\text
dexiakeraia \LGR\textqoppa \let \protect \LGR\textdexiakeraia \LGR\textzeta \le
t \protect \LGR\textdexiakeraia \protect \LGR\textdexiakeraia .
<argument> ...um {\greeknumeral {1997}}\show \num

1.90 ...k{\edef\num{\greeknumeral{1997}}\show\num}
}
```

---

from which the desired string of LICRs, is extracted; viz.

---

```
\textaristerikeraia\textalpha\textsampi\textqoppa\textzeta\textdexiakeraia
```

---

The corresponding trick does not work with  $\text{\LaTeX}$ , but the uppercasing can be done manually from the string obtained using  $\text{\LaTeX}$ ,

---

```
\textaristerikeraia\textAlpha\textSampi\textQoppa\textZeta\textdexiakeraia
```

---

leaving the initial and final  $\text{\LaTeX}$  macros as all lowercase. For smooth processing, remove or comment-out the added line after collecting the LICRs.

#### 4.1.4. Metadata with Armenian

The  $\text{\LaTeX}$  package<sup>9</sup> provides the method to typeset Armenian, with input being specified in various ways including a transliteration scheme from ASCII input. This transliteration is directed at the use of the OT6 encoding, developed for this purpose. Each way is supported by pdfx.sty with appropriate loading options, similar to the support for Greek (see Section 4.1.3).

- no option: all metadata in .xmpdata file is in UTF-8 (incl. ASCII)
- armxmp: using LICR-like macro names; e.g. \armAbyb, \armsha, \armfe etc.
- AR8xmp: using the  $\text{\LaTeX}$  (OT6) transliteration scheme or with upper-range characters in ArmSCII8 encoding, using the ‘parser’ macro \textARM.

There are 39 letters in the Armenian alphabet, so the transliteration includes many 2-letter combinations to specify the desired character. Whereas Greek uses punctuation symbols to specify diacritics, Armenian requires either ligatures implemented in the OT6-encoded font, or careful parsing of the input into LICR-like macros.  $\text{\LaTeX}$  source<sup>10</sup> for the  $\text{\LaTeX}$  documentation is available in both English and Armenian. Figure 11 shows the result of enriching the Armenian version with relevant metadata, using coding as shown in Figure 12.

As in earlier examples, that metadata has come from the extensive comments at the head of the  $\text{\LaTeX}$  source file (represented by ... in Figure 12), and other title-page material, such as title and author names in both English and Armenian. Within the keywords are armenian words that are mentioned in the documentation as being slightly tricky to represent in transliteration, to verify that the required tricks have been correctly implemented.

<sup>9</sup>documentation: TeXLive: .../2016/texmf-dist/doc/generic/armenian/

<sup>10</sup>TeXLive: .../2016/texmf-dist/doc/generic/armenian/examples/latex/

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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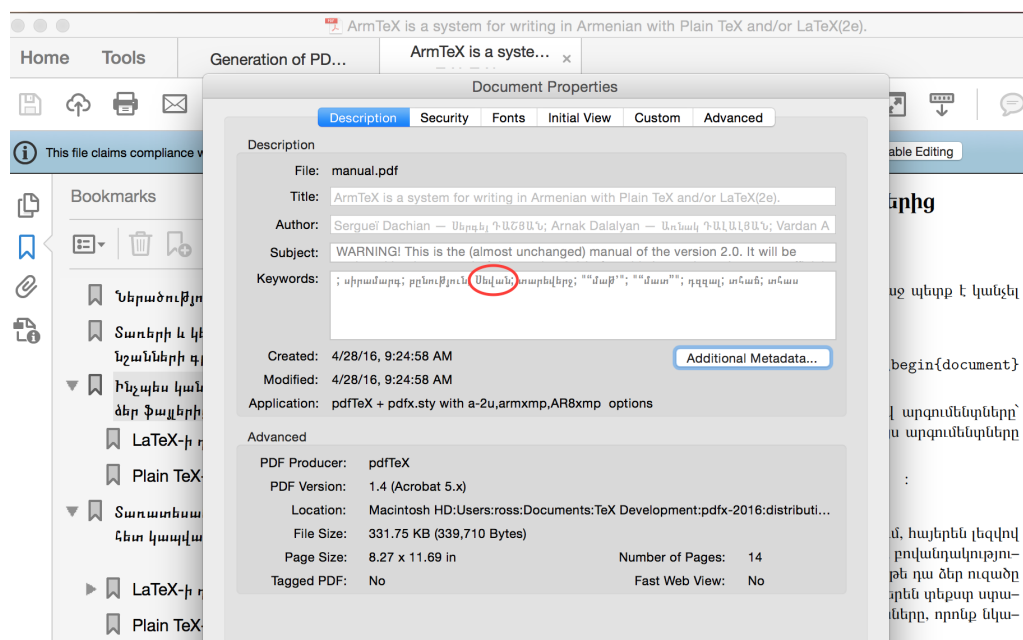


Figure 11: Metadata generated from the coding shown in Figure 12 using the Armenian language specified using ArmTeX transliteration. Bookmarks have been generated in Armenian. Figure 13 explains how the word indicated in red is obtained via parsing.

Also apparent in Figure 11 is the use of Armenian letters in the Bookmarks pane, having been generated from the transliteration source. This requires a 3-step process, as follows.

1. conversion of transliterated source into UTF-8. This is done as the .xmpdata file is processed, using `\pdfxEnableCommands` to make global definitions; e.g,

```
\xdef\ssectAtitle{\textARM{Nerac'uthyun}}
```

capturing the section title in the form supplied in the  $\text{\TeX}$  source. This can be seen in Figure 12, near the end of the `{filecontents*}` environment, and at the bottom where the `\section` command would occur.

2. conversion of the UTF-8 representation into UTF16-be, suitable for bookmark strings within the PDF file. With pdfTeX this is done using `\StringEncodingConvert` from Heiko Oberdiek's `stringenc.sty` package. LuaTeX and XeTeX can use the UTF-8 representation directly.
3. integration of the UTF16-be string (pdfTeX) or UTF-8 string (LuaTeX and XeTeX) into the coding that would normally generate the bookmark from a provided section title, in transliterated form.

These last two steps are combined into a single command, to replace the usual command for a section title; `\section`, `\subsection`, etc.

```
\pdfxBookmark{\section}{\ssectAtitle}{Nerac'uthyun}
```

Now `\pdfxBookmark` first checks that the macro passed as the 2nd argument actually exists. If it does not, an error message is given and upon continuation would just do `\section{Nerac'uthyun}` as normal. When it does exist, then step 2 is done (by pdfTeX) storing the result as `\pdfx@temp`.

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
%%
%%
%% This is the 'manual.tex' file (ArmTeX manual in Armenian).
...
%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\providecommand{\pdfxopts}{a-2u,armxmp,AR8xmp}
\immediate\write18{rm \jobname.xmpdata}
\begin{filecontents*}{\jobname.xmpdata}
\Title{ArmTeX is a system for writing in Armenian with Plain TeX and/or LaTeX(2e).\textLF
\textARM{\textARM{\aroff\TeX}-um ev {\aroff\LaTeX}-um Hayeren Lezvov Grelu Hamakarg}}
\Author{Sergue\i Dachian \textARM{--- Sergey DASHYAN}\sep Arnak Dalalyan
\textARM{--- Ar'nak DALALYAN}\sep Vardan Akopian \textARM{--- Vardan HAKOBYAN}}
\Copyright{\textcopyright 1997\textendash 2013 ArmTeX may be distributed and/or modified
under the conditions of the LaTeX Project Public License, either version 1.3 of this
license or (at your option) any later version.}
\CopyrightURL{http://www.latex-project.org/lppl.txt}
\Subject{WARNING! This is the (almost unchanged) manual of the version 2.0. It will be
replaced by the manual of the version 3.0 before this beta release becomes official.
A (temporary) brief description of the new features of \latArmTeX~3.0 can be found at
the end of the ``readme.txt'' file. \textLF
\textLF\textARM{OWSHADROWT'YO\WN: Sa tarberak 2.0-i (grethe anphophox) dzer'narkn e': Ayn
kphoxarinv tarberak 3.0-i dzer'narkov naxqan ays beta tho\ghark\man pashtonakanacowmu':
\ArmTeX~3.0-i nor hnaravoruthyunneri (g'a\ma\na\ka\vor) hamar'ot nkaragrowmu' (angleren
levzov) karogh eq gu'tarmuh nel``}\readme.txt\textARM{'' fayli verjum:}
\textLF\textLF\textARM{Hamakargu' o'gtagorc'elu hamar bavakan e' karoghanal ayn kanchel dzer
fayleric, tirapetel tar'qatesakneru' phoxogh hramannerin ev i\ma\nal the inchpes petq e'
nermuc'el teqstu' steghnasharic: Ays gor\c'o\ghu\thyun\ne\ru' nkaragrvac' en hajordogh
ereq bag'innerum:}}
\Keywords{\textARM{si\ra\marg}\sep \textARM{bu'armuh nuthyun}\sep \textARM{Se'armuh van}
\sep \textARM{tare\*verj}\sep \textARM{'mat''}\sep \textARM{'mat''}\sep \textARM{d\*zzal}
\sep \textARM{t\*haj'}\sep \textARM{t\*has}}
\CoverDisplayDate{1 June 1999 (\textARM{1-u' hunisi 1999 th.})}
\Creator{pdfTeX + pdfx.sty with \pdfxopts\space options}
\pdfxEnableCommands{\let\sl\empty%
\def\sectAtitle{\textARM{Nerac'uthyun}}%
\def\sectBtitle{\textARM{Tar'eri ev ketadrakan nshanneri greldazevu'}}%
...
\def\sectFtitle{\textARM{ArmTeX-i phophoxman patmuthyunu'}}%
}
\end{filecontents*}

\documentclass[12pt,a4paper]{article}
\usepackage[\pdfxopts]{pdfx}
\hypersetup{colorlinks,allcolors=blue}
...
\title{\textARM{\textARM{\aroff\TeX}-um ev {\aroff\LaTeX}-um Hayeren Lezvov
Grelu Hamakarg}\ \normalsize\aroff (\latArmTeX: a System for Writing in Armenian
with \TeX\ and \LaTeX)}}
\author{...}%
\date{1-u' hunisi 1999 th.}
...
\begin{document}
\maketitle
...
%\section{\sectAtitle}%{Nerac'uthyun}
\pdfxBookmark{\section}{\sectAtitle}{Nerac'uthyun}
```

Figure 12: Enriched  $\text{\LaTeX}$  source for the Armenian version of the  $\text{\LaTeX}$  manual, with added metadata demonstrating the  $\text{\LaTeX}$  transliteration scheme for OT6 encoding. Also shown is coding used to produce bookmarks from the transliteration.

With  $\text{\LaTeX}$  and  $\text{\XeTeX}$ , `\pdfx@temp` stores a copy of the UTF-8 data. Then the commands needing to be executed are essentially

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```
\pdfstringdefDisableCommands{\let\sectAtitle\pdfx@temp}
\def\sectAtitle{Nerac'uthyun}
\section{\sectAtitle}
```

so that the correct section heading is displayed on the page, but when `\sectAtitle` is processed to create a bookmark it is replaced by the pre-prepared contents of `\pdfx@temp`. There are some technicalities<sup>11</sup> to make this work cleanly, as just doing these commands would interfere with other uses of `\pdfstringdef`. In case a long sectioning command has an optional argument, or a \*-variant is needed, then include it this way.

```
\pdfxBookmark[Ar'avot e'r]{\section*{\sectAtitle}{Ar'avot e'r, Araratyan dashti ...}}
```

#### 4.1.5. Other Languages

There is support for Metadata using characters from other languages, with corresponding loading options, as follows.

- `arbxmp` : Arabic; via LICRs `\textarabicallef`, `\textarabicqaf`, `\textarabicalflowerhamza`, etc.
- `devxmp` : Devanagari; via LICRs `\textdevanagaria`, `\textdevanagarivocalicr`, `\textdevanagaricandrabindu`, etc.
- `hebxmp` : Hebrew; via LICRs `\hebalef`, `\hebsamekh`, `\hebfinalpe` and accent marks `\segol`, `\qubuts`, etc.
- `vnmxmp` : Vietnamese; via LICRs `\ABREVE`, `\OCIRCUMFLEX`, `\uhorn` etc. and the combinations of multiple accents applied as usual via `\'`, `\``, `\^`, etc.

The LICRs include support mapping accented letters to precomposed glyphs, falling back on ‘combining characters’ only in unusual situations. Special input conventions or methods, such as transliteration schemes, are *not yet* supported. Indeed, these options are largely untested, so any difficulties encountered should be reported to the package authors. Requests to support extra input methods or other language blocks should also be directed to the authors, along with pointers to where the desired input methods are fully described. Sample ‘real-world’ documents would be greatly appreciated.

#### 4.2. L8U pseudo-encoding

To understand how pdfx handles the translation into UTF-8 of input that is not already in that format, we’ll briefly discuss T<sub>E</sub>X’s font-encoding mechanism, which is the basis for LICR macros [22, § 7.11]. As an example, consider the macro `\textgamma` representing the lowercase Greek letter  $\gamma$ . Various T<sub>E</sub>X packages declare this as LICR in different ways, for different purposes.

```
greek-fontenc/lgrenc.def:\DeclareTextSymbol{\textgamma}{LGR}{103}
tipa/t3enc.def:\DeclareTextSymbol\textgamma{T3}{71} % Gamma
greek-fontenc/greek-euenc.def:\DeclareTextCommand{\textgamma}{\LastDeclaredEncoding}{Î1}
hyperref/puenc.def:\DeclareTextCommand{\textgamma}{PU}{\83\263}%* U+03B3
ucs/data/uni-2.def:\uc@dc1c{611}{tipa}{\textgamma}%
ucs/data/uni-3.def:\uc@dc1c{947}{default}{\textgamma}%
```

Here the `\uc@dc1c` commands associate UTF-8 input of Ux0263 (IPA small letter gamma) and Ux03B3 (Greek small letter gamma) internally with `\textgamma`, whereas the others deal with

<sup>11</sup>In fact a small change is made to how `\@writetorep` is used.



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output formats<sup>12</sup>. In four of these examples there is a number, which refers to a position in an ‘encoding vector’ for the particular font used to place the character onto the printable page. For example `LGR` refers to greek fonts, encoded as explained in Section 4.1.3. IPA phonetics use the `T3` encoding, so `\textgamma` refers to a character from a different Unicode block.

With two of these cases there is no specific font. For example, `PU` is used to create book-mark strings, and other PDF string inclusions, using `\pdfstringdef` from the `hyperref` package. With `greek-euenc.def` designed for XeTeX and LuaTeX, the encoding can be variable, with the output bytes being those for the UTF-8 encoding of  $\gamma$ , namely `^^ce^^b3`, shown here as the `T1`-encoded pair `îï`. The term ‘pseudo-encoding’ has been coined by the  $\TeX$  team. Although there is no actual font to determine the encoding, to an author there is essentially no difference in how corresponding macros can be used to get a character placed into an appropriate structure within the PDF.

Thus there are 4 output forms for this character, and we’ve not even considered how  $\gamma$  is used in mathematics! To handle these concurrently, one has internally-defined control-sequence names

```
\LGR\textgamma=\char"67      where  $6 \times 16 + 7 = 103$ 
\T3\textgamma=\char"47       where  $4 \times 16 + 7 = 71$ 
\PU\textgamma=\long macro:->\83\263
\L8U\textgamma=\long macro:->îï
```

where the 2nd ‘\’ is part of the name<sup>13</sup>. The latter macro is explained below. To use the specific version of the macro,  $\TeX$  maintains a ‘font-encoding’ parameter, set using `\fontencoding{...}` local to the surrounding environment grouping.

To the above declarations of `\textgamma`, to deal with conversion to UTF-8, the `pdfx` package adds the following declarations when the `LGRxmp` option is used.

```
pdfx/l8ugrk.def:\DeclareTextCommand{\textgamma}{L8U}{îï}
pdfx/l8ugrk.def:\DeclareTextCompositeCommand{\textLGRenc}{L8U}{\textgamma}{îï}
pdfx/l8ugrk.def:\DeclareTextCompositeCommand{\textLGRenc}{L8U}{g}{îï}
pdfx/l8ugrk.def:\DeclareTextCompositeCommand{\textLGRenc}{L8U}{^^e3}{îï}
```

The pseudo-encoding name `L8U` indicates Local conversion into UTF-8 Unicode, as required for metadata, using `pdfx.sty`. Currently this pseudo-encoding is used in one place only; during the interpretation of information supplied through the `\jobname.xmpdata` file. This happens as part of the `pdfx` package, *before* it uses `xmpincl.sty`. Such specificity justifies being called a ‘Local’ encoding. However, other tasks may emerge requiring on-the-fly conversion to UTF-8. In this case all the functionality of this pseudo-encoding could be shifted into a separate package, and the name changed to reflect this more general usage. Bookmarks from transliterated input, as described in Section 4.1.4, is possibly a sufficient reason to have a separate package. Another possibility is to generate on-the-fly creation of UTF-8 strings, to be sent to XeTeX or LuaTeX running as a slave process to generate images of string using OTF fonts, which pdfTeX currently cannot handle. The result would then be imported back into the running job as an image. The authors invite suggestions of how this `L8U` pseudo-encoding functionality can be put to good use.

Accented letters normally use (e.g., from `t1enc.def`)

```
\DeclareTextComposite{\`}{T1}{A}{192}
```

to get the pre-composed ‘À’, rather than a composite built from ‘ and ‘A’. The last parameter

<sup>12</sup>Whereas `ucs.sty` handles UTF-8 input, mapping it to LICRs, with `pdfx.sty` we need the reverse mapping into UTF-8, not just from LICRs but also from legacy 8-bit encodings and transliteration schemes.

<sup>13</sup> obtained using `\csname LGR\string\textgamma\endcsname`.

is an index into a font; however the `\DeclareTextCompositeCommand` variant allows arbitrary coding as that final parameter, so can be the bytes for the UTF-8 representation of a character. In the above code lines, macros are defined as follows

---

```

\\L8U\textLGRenc-\textgamma=macro:->Î
\\L8U\textLGRenc-g=macro:->Î
\\L8U\textLGRenc-ã=macro:->Î

```

---

where now the 2nd and 3rd (and perhaps 4th) ‘\’ are part of the name<sup>14</sup>. This shows how the ascii letter ‘g’ is associated with the UTF-8 bytes for  $\gamma$ , and how the upper 8-bit character from  $\text{^e3}$  can be similarly associated, as in ISO-8859-7 encoding.

All these associations come together in the ‘parser’ macro `\textLGR` which works as follows. Firstly, `\textLGR` is declared for L8U pseudo-encoding only, where it expands as follows.

---

```

\\L8U\textLGR #1->\textgreekLGRstring {#1}
\\L8U\textgreekLGRstring #1->\textgreekLGR@ii #1\@empty \@empty
\textgreekLGR@ii #1#2\@empty -> ... coding to test what is in #2
... \textLGRenc{#1}\@empty if #2 is \@empty
... \textLGRenc{#1}\textgreekLGR@i #2\@empty if #2 has more tokens
\textgreekLGR@i #1->\textgreekLGR@ii #1

```

---

Thus `\textLGRenc` is called on each token in the argument of `\textLGR`. Now `\textLGRenc`, which is applicable only when L8U pseudo-encoding is in effect, has a default expansion of just passing the character through unchanged; viz.

---

```

\DeclareTextCommand{\textLGRenc}{L8U}[1]{#1}

```

---

but by using `\DeclareTextCompositeCommand{\textLGRenc}{L8U}{...}{...}`, alternate expansions apply with specific arguments, as shown above. In particular, that final argument can include coding that ‘looks ahead’ to find the next character. This is used, for example, with diacritics in Greek, multi-letter sequences for Armenian letters, and other special cases related to ligatures and punctuation symbols. To illustrate this Figure 13 (below) follows the conversion of a specific word, given in the transliteration for Armenian (see Section 4.1.4). This conversion occurs using only T<sub>E</sub>X’s macro-expansion ability. Some details relevant to this example are explained there.

Note how in Figure 13 the ArmT<sub>E</sub>X user macro `\armuh` gets aliased to an LICR called `\textarmuh`. Since `\armuh` is already defined, not as an LICR, it cannot be declared to be one without creating problems. Instead, within the environment grouping where L8U pseudo-encoding is specified, one uses `\let\armuh\textarmuh` within a ‘rebinding’ macro command `\LIIXUmaparmenianletters`<sup>15</sup> to get LICR functionality from user-commands.

---

```

\def\LIIXUmaparmenianletters{%
  \let\ArmTeX\textArmTeX
  \let\Armayb\textArmayb
  ...
  \let\armuh\textarmuh
  ...
  \def\armbf{}%
  ... }

```

---

As well as rebinding each command for a letter, the font style-switching commands are aliased to do nothing, as these are not relevant to creating UTF-8 output. Being localised by the

<sup>14</sup> obtained using `\csname\string\LGR\string\textLGRenc-\string\textgamma\endcsname`.

<sup>15</sup>The start of the macro name is derived from pseudo-Roman numerals: IX = 9, IIX = 8





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## 4.3. Nested Parsing — Mathematics in Metadata

Macro commands for many mathematical symbols can be used directly in metadata without extra support; e.g., basic arithmetic operations, letter-like symbols, spacing commands. Super- and subscripted letters and numerals can use `\textsuperscript` and `\textsubscript` when there is an appropriate Unicode character (digits, comma, +/−/=, parentheses, many letters but not all).

When the `mathxmp` loading option is specified, many more symbols become available, using ‘rebinding’ macros. These are necessary, as the macros for mathematical symbols are generally *not* defined as LICRs, but use `\mathchar`. Thus new LICRs are needed, and existing names bound to these.

---

```
\LIIXUmapmathaccents using ‘combining’ characters from Unicode ranges at Ux0300, Ux1DC0, Ux20D0
\LIIXUmapisomathgreek using Ux0391–Ux03F8 for greek symbols
\LIIXUmapmatharrowsA supporting symbols in the Ux2190–Ux21FF block
\LIIXUmapmathoperatorsA supporting symbols in the Ux2200–Ux227F block
\LIIXUmapmathoperatorsB supporting symbols in the Ux2280–Ux22FF block
\LIIXUmapmiscmathsymbolsA supporting some symbols in the Ux27C0–Ux27EF range
\LIIXUmapsupparrowsA supporting some symbols in the Ux27F0–Ux27FF block
\LIIXUmapsupparrowsB supporting some symbols in the Ux2900–Ux297F block
\LIIXUmapmiscmathsymbolsB supporting symbols in the Ux2980–Ux29FF block
\LIIXUmapsuppmathoperators supporting symbols in the Ux2A00–Ux2AFF block
\LIIXUmapunimathgreek using Ux1D6E2–Ux1D71B for greek symbols
\LIIXUmapmathalphabets allows access to symbols in the Ux1D400–Ux1D755 block
```

---

The ‘parser’ macro idea can extend to handle a large class of mathematical expressions.

---

```
\let\(\textinlinemath
\DeclareTextCommand{\textinlinemath}{L8U}{\liixu@getinlinemath}
\def\liixu@getinlinemath#1\){\space\textmathnormalstring{#1}\space}
\DeclareTextCommand{\textmathnormalstring}{L8U}[1]{\textmathnormal@ii#1\empty\empty}
\textmathnormal@ii #1#2\empty -> ... coding to test what is in #2
... \textmathnormal{#1}\empty if #2 is \empty
... \textmathnormal{#1}\textmathnormal@ii #2\empty if #2 has more tokens
\let\[\textdisplaymath defined similarly to call \textmathnormalstring
```

---

This allows `\textmathnormal` to test each token, in particular mapping letters A–Za–z into the Unicode range Ux1D44E–Ux1D467 (except for *h*). Mathematical styles, such as `\mathrm`, `\mathbf`, `\mathbb` etc. can now be handled using declarations such as:

---

```
\Dec...positeCommand{\textmathnormal}{L8U}{\mathrm}{\liixu@mathreorder\textmathrmstring}
\Dec...positeCommand{\textmathnormal}{L8U}{\mathbf}{\liixu@mathreorder\textmathbfstring}
```

---

where `\liixu@mathreorder` uses some T<sub>E</sub>X pattern-matching to allow the `\textmathrmstring` parser macro to work on the argument to `\mathrm` before allowing `\textmathnormal` parsing to continue afterwards. We refer to this as ‘nested parsing’.

Similarly ‘nested parsing’ can be used with superscripts and subscripts using `^{\dots}` and `_{\dots}` and to specify linebreaks, and even super-/subscripts within styles; viz.



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```
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{^}{\liixu@mathreorder\textsuperstring}
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{_}{\liixu@mathreorder\textsubstring}
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{\}{\liixu@mathreorder\textsuperstring}
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{\cr}{\liixu@mathreorder\textsuperstring}
\DeclareTextCompositeCommand{\textmathrm}{L8U}{^}{\liixu@mathreorder\textsuperstring}
\DeclareTextCompositeCommand{\textmathrm}{L8U}{_}{\liixu@mathreorder\textsubstring}
```

Such ‘nested parsing’ seems to be quite robust<sup>16</sup>, but a great deal more testing is required to uncover cases which may require special handling. An ultimate aim is to be able to just copy the  $\text{\LaTeX}$  source for the ‘Abstract’ of a technical paper into the `\Subject{...}` field of the `.xmpdata` file, with a large expectation that it will ‘just work’, or need only trivial edits to make it so.

## 4.4. Metadata in a Production Workflow

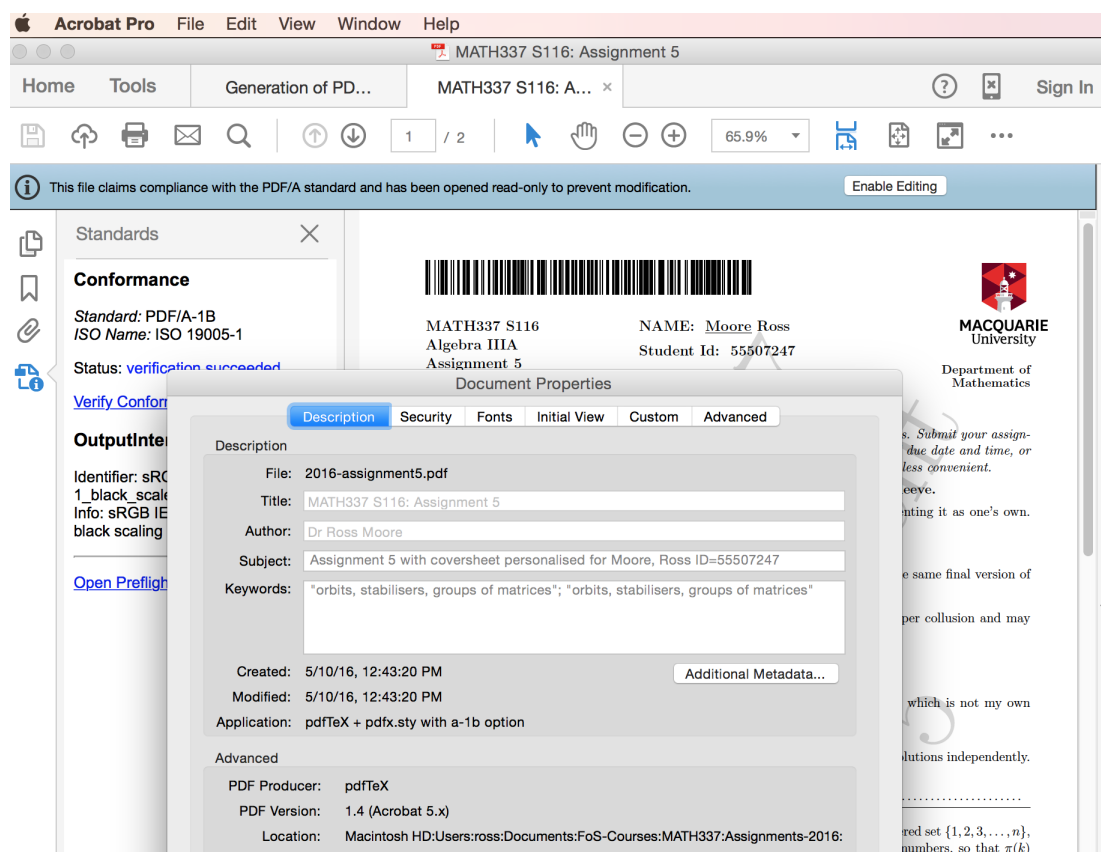


Figure 15: Metadata from student assignment papers, using information drawn from a database. The start of the  $\text{\LaTeX}$  coding for this example is shown in Figure 16.

At Macquarie University, the Mathematics Department produces personalised topmatter or coversheets for student assignments and tutorial papers using  $\text{\LaTeX}$ , incorporating information that has been stored in a database. This is done by writing extra definitions at the top of a copy of the  $\text{\LaTeX}$  source as prepared by the lecturers. For example information analogous to the following

<sup>16</sup> ... so far, barring multi-line aligned environments.



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```
\def\thestudentname{\utext{Moore} Ross}
\def\thestudentid{55507247}
\def\theunitcode{MATH337}
\def\theoffering{S116}
\def\thetaskname{Assignment 5}
\def\theassignmentnumber{5}
\def\theduedate{09/05 2016}
...
```

is prepended to the file shown in Figure 16, for each student downloading their personalised assignment paper. The  $\LaTeX$  source makes use of this information, including recording some of it within the Metadata. When preparing such documents  $\LaTeX$ 's `\providecommand` is used

```
\providecommand{\theassignmentnumber}{5}
\providecommand{\assignLecturer}{Dr Ross Moore}
\providecommand{\theunitcode}{MATH337}
\providecommand{\theunitname}{Algebra IIIA}
\providecommand{\theyear}{2016}
...
\def\assigntopics{orbits, stabilisers, groups of matrices}
\providecommand{\pdfxopts}{a-1b}
%% XMP metadata for PDF/A conformance
\begin{filecontents*}{\jobname.xmpdata}
\Title{\theunitcode\ \theoffering: Assignment \theassignmentnumber}
\Author{\assignLecturer}
\Copyright{Macquarie University, Mathematics Department}
\Subject{Assignment \theassignmentnumber, with coversheet personalised for \thestudentname,
id = \thestudentid}
\Keywords{\assigntopics}
\Creator{pdfTeX + pdfx.sty with \pdfxopts\space option}
\pdfxEnableCommands{\def\utext#1{#1,}}
\end{filecontents*}

\documentclass[a4paper,11pt]{article}
\RequirePackage{assignments}
\usepackage[\pdfxopts]{pdfx}
```

Figure 16: Start of the  $\LaTeX$  source for an assignment paper, using macro expansion values supplied via definitions prepended to this file.

to supply default values, not drawn from the database; but when actually used, these are ignored as the required information has been supplied using  $\TeX$ 's `\def` command. The resulting metadata is as in Figure 15, showing also how the information is displayed at the top of the PDF file that is produced. Notice how a command `\utext` is included to obtain the underlining of the surname within the produced PDF. This is modified, using `\pdfxEnableCommands` in the `\jobname.xmpdata` file, to just place a comma after the surname in the metadata, as it precedes the given name.

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Another way that jobs can be customised using essentially the same  $\text{\TeX}$  source, is via the command used to initiate the job. For example the file `sample.tex`, accompanying the `pdfx` distribution, can be used to test the loading options to create PDFs conforming to the various flavours of PDF/A, PDF/E and PDF/X. Consider a shell script containing the following (Unix/Linux) commands.

```
pdflatex "\def\pdfxopt{a-2b}\input sample.tex"
pdflatex "\def\pdfxopt{a-2b}\input sample.tex"
mv sample.pdf sample-a2b.pdf

pdflatex "\def\pdfxopt{a-2u}\input sample.tex"
pdflatex "\def\pdfxopt{a-2u}\input sample.tex"
mv sample.pdf sample-a2u.pdf
...
```

With a 3-line block for each flavour, this produces a corresponding PDF from the same  $\text{\TeX}$  source, named according to each particular variant. A default `\providecommand{\pdfxopt}{a-1b}` at the start of `sample.tex` catches the case of normal typesetting, doing nothing when `\pdfxopt` already has an expansion value.

## 4.5. Further Developments

Prospects for further development of the `pdfx` package are as follows, listed not necessarily in order of perceived importance.

- Support for the `dvips` driver with Ghostscript as PDF producer; possible since `gs v9.21`.
- Separate the L8U pseudo-encoding support into a separate package.
- Conformance to multiple PDF standards; e.g. both PDF/A and PDF/E, both PDF/A and PDF/X with RGB or CMYK color profile, other combinations.
- Explore delaying the processing of metadata until `\begin{document}`, thereby allowing some fields to be set automatically from other information supplied within the document preamble.
- Support for input using other legacy 8-bit encodings and transliterations.
- Support for more mathematical environments within the metadata.
- Support for more PRISM metadata fields, incl. PRISM 3.0 [26].
- Explore ways to overcome incompatibilities that may arise with other packages.
- Full support for PDF/VT; in particular, transparency groups and PDF/VT-2s.
- Support for more aspects of PDF/UA and ‘Tagged PDF’.
- Develop ways to usefully use L8U apart from metadata and bookmarks.
- Support emerging standards based on PDF 2.0 [21].

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Revised as ISO 14289-1:2014 (December 2014): [http://www.iso.org/iso/home/store/catalogue\\_tc/catalogue\\_detail.htm?csnumber=64599](http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=64599).  
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PDF/E: <https://en.wikipedia.org/wiki/PDF/E>  
PDF/VT: <https://en.wikipedia.org/wiki/PDF/VT>  
PDF/UA: <https://en.wikipedia.org/wiki/PDF/UA>  
PDF/X: <https://en.wikipedia.org/wiki/PDF/X>

## 6. Implementation

```
1 \ifpackageloaded{pdfxmult}{%
2   \PackageError{pdfx}%
3   {^^JThis package may not be used in conjunction with the \space
4     pdfxmult \space package}%
5   {Type \space x <return> \space to exit; or just \space <return> \space
6     to continue without this package.}%
7   \expandafter\let\csname opt@pdfx.sty\endcsname\@empty\endinput
8 }{}%
9 \NeedsTeXFormat{LaTeX2e}
10 \ProvidesPackage{pdfx}
11   [2018/11/29 v1.6 PDF/X and PDF/A support (CVR/HTH/RRM/PS)]
12
13 \newif\ifpdfx@noBOM \pdfx@noBOMfalse % use a BOM in the XMP packet
14 \newif\ifpdfx@x \pdfx@xfalse % PDF/X mode
15 \newif\ifpdfx@e \pdfx@efalse % PDF/E mode; not fully implemented yet
16 \newif\ifpdfx@ua \pdfx@uafalse % PDF/UA mode; not fully implemented yet
17 \newif\ifpdfx@vt \pdfx@vtfalse % PDF/VT mode, extension of PDF/X
18 \newif\ifnoiccpfile % used with PDF/X-4p and PDF/X-5pg
19 \newif\ifpdfx@noerr % error messages become just warnings
20
21 \DeclareOption{noerr}{\pdfx@noerrtrue}
22
23 %% Not all combinations of the following parameters are meaningful.
24 \def\xmp@Part{1} % PDF/A part: 1, 2, or 3
25 \def\xmp@Conformance{B} % Conformance level: A, B, or U
26 \def\xmp@ReleaseDate{2005} % 2001 for PDF/X-1, 2005 for PDF/A-1,
27 % 2010 for PDF/A-2, 2012 for PDF/A-3.
28
29 \newcount\pdfx@minorversion
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
30 \expandafter\ifx\csname pdfminorversion\endcsname\relax
31 \else
32   \global\pdfx@minorversion=\the\pdfminorversion
33 \fi
34
35 \def\pdfx@ErrorWarning#1#2#3#4{%
36   \ifpdfx@noerr \PackageWarning{pdfx}{#1.^J #2#3.^J}%
37   \else \PackageError{pdfx}{#1}{#2#4.^J
38     Use option 'noerr' to avoid this message.^J}%
39   \fi}
40
41 \def\pdfx@Xvn@message{%
42   \pdfx@ErrorWarning{PDF/X-5n has no default profile}%
43   {Provide your own}; continuing to build a non-valid document}%
44   {, else continue to build a non-valid document}%
45 }
46
47 %% PDF/A options
48 %% default is to create PDF/A-1b
49 %% options can change this for PDF/X or higher levels of PDF/A
50 \DeclareOption{a-1a}{\global\pdfx@xfalse\def\xmp@Part{1}%
51   \def\xmp@Conformance{A}\def\xmp@ReleaseDate{2005}}
52 \DeclareOption{a-1b}{\global\pdfx@xfalse\def\xmp@Part{1}%
53   \def\xmp@Conformance{B}\def\xmp@ReleaseDate{2005}}
54 \DeclareOption{a-2a}{\global\pdfx@xfalse\def\xmp@Part{2}%
55   \def\xmp@Conformance{A}\def\xmp@ReleaseDate{2010}}
56 \DeclareOption{a-2b}{\global\pdfx@xfalse\def\xmp@Part{2}%
57   \def\xmp@Conformance{B}\def\xmp@ReleaseDate{2010}}
58 \DeclareOption{a-2u}{\global\pdfx@xfalse\def\xmp@Part{2}%
59   \def\xmp@Conformance{U}\def\xmp@ReleaseDate{2010}}
60 \DeclareOption{a-3a}{\global\pdfx@xfalse\def\xmp@Part{3}%
61   \def\xmp@Conformance{A}\def\xmp@ReleaseDate{2012}}
62 \DeclareOption{a-3b}{\global\pdfx@xfalse\def\xmp@Part{3}%
63   \def\xmp@Conformance{B}\def\xmp@ReleaseDate{2012}}
64 \DeclareOption{a-3u}{\global\pdfx@xfalse\def\xmp@Part{3}%
65   \def\xmp@Conformance{U}\def\xmp@ReleaseDate{2012}}
66 %%
67 %% PDF/X options
68 %% comments added, using
69 %% https://www.eci.org/_media/downloads/pdfx/pdfx_faq_english_nov05.pdf
70 %% https://en.wikipedia.org/wiki/PDF/X#List_of_the_PDF.2FX_standards
71 %%
72 \DeclareOption{x-1}{\global\pdfx@xtrue\def\xmp@Part{1}% obsolete
73   \def\xmp@Conformance{a}\def\xmp@ReleaseDate{1999}% CMYK only
74   \global\pdfx@minorversion=2\relax
75   \pdfx@ErrorWarning{PDF/X-1:1999 is no longer an accepted standard}%
76   {Use option x-1a1 or x-1a3 }; continuing to build a non-valid document}%
77   {, else continue to build a non-valid document.}%
78 }% effectively same as x-1a1
79 \DeclareOption{x-1a}{\global\pdfx@xtrue\def\xmp@Part{1}% CMYK only
80   \def\xmp@Conformance{a}\def\xmp@ReleaseDate{2003}%
81   \global\pdfx@minorversion=3}% same as x-1a3
```



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```
82 \DeclareOption{x-1a1}{\global\pdfx@true\def\xmp@Part{1}%
83 \def\xmp@Conformance{a}\def\xmp@ReleaseDate{2001}% ISO 15930-1:2001
84 \global\pdfx@minorversion=3 }
85 \DeclareOption{x-1a3}{\global\pdfx@true\def\xmp@Part{1}%
86 \def\xmp@Conformance{a}\def\xmp@ReleaseDate{2003}% ISO 15930-4:2003
87 \global\pdfx@minorversion=3 }
88 \DeclareOption{x-2}{\global\pdfx@true\def\xmp@Part{2}% XMP Metadata
89 %% \def\xmp@Conformance{}\def\xmp@ReleaseDate{2002}% ISO 15930-2:2003
90 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2003}% ISO 15930-5, withdrawn 2011
91 \global\pdfx@minorversion=4\relax
92 \pdfx@ErrorWarning{PDF/X-2:2003 was never published as a standard}%
93 {Use option x-1a or x-3 }{; continuing to build a non-valid document}%
94 {, else continue to build a non-valid document}%
95 }% external OPI workflow, i.e. multiple files involved
96 \DeclareOption{x-3}{\global\pdfx@true\def\xmp@Part{3}% RGB allowed, but rare!
97 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2003}%
98 \global\pdfminorversion=4 }% same as x-303
99 \DeclareOption{x-302}{\global\pdfx@true\def\xmp@Part{3}%
100 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2002}% ISO 15930-3:2002
101 \global\pdfx@minorversion=3 }
102 \DeclareOption{x-303}{\global\pdfx@true\def\xmp@Part{3}%
103 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2003}% ISO 15930-6:2003
104 \global\pdfx@minorversion=4 }
105 %% Later versions, yet to be fully implemented
106 \DeclareOption{x-4}{\global\pdfx@true\def\xmp@Part{4}%
107 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2010}% ISO 15930-7:2010
108 \global\pdfx@minorversion=6 }% same as x-410
109 \DeclareOption{x-4p}{\global\pdfx@true\global\no@iccprofiletrue
110 \def\xmp@Part{4}\def\xmp@Conformance{p}\def\xmp@ReleaseDate{2010}%
111 \global\pdfx@minorversion=6 }% same as x-4p10
112 \DeclareOption{x-408}{\global\pdfx@true\def\xmp@Part{4}%
113 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2008}% ISO 15930-7:2008
114 \global\pdfx@minorversion=6 }
115 \DeclareOption{x-410}{\global\pdfx@true\def\xmp@Part{4}%
116 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2010}% ISO 15930-7:2010
117 \global\pdfx@minorversion=6 }
118 \DeclareOption{x-4p08}{\global\pdfx@true\global\no@iccprofiletrue
119 \def\xmp@Part{4}\def\xmp@Conformance{p}\def\xmp@ReleaseDate{2008}%
120 \global\pdfx@minorversion=6 }% ISO 15930-7:2010
121 \DeclareOption{x-4p10}{\global\pdfx@true\global\no@iccprofiletrue
122 \def\xmp@Part{4}\def\xmp@Conformance{p}\def\xmp@ReleaseDate{2010}%
123 \global\pdfx@minorversion=6 }% ISO 15930-7:2010
124 \DeclareOption{x-5}{\global\pdfx@true\def\xmp@Part{5}%
125 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
126 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
127 \DeclareOption{x-5g}{\global\pdfx@true\def\xmp@Part{5}%
128 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
129 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
130 \DeclareOption{x-5n}{\global\pdfx@true %\global\no@iccprofiletrue
131 \def\xmp@Part{5}\def\xmp@Conformance{n}\def\xmp@ReleaseDate{2010}%
132 \global\pdfx@minorversion=6 \pdfx@Xvn@message}% ISO 15930-8:2010
133 \DeclareOption{x-5pg}{\global\pdfx@true\global\no@iccprofiletrue
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
134 \def\xmp@Part{5}\def\xmp@Conformance{pg}\def\xmp@ReleaseDate{2010}%
135 \global\pdfx@minorversion=6}% ISO 15930-8:2010
136 \DeclareOption{x-508}{\global\pdfx@true\def\xmp@Part{5}%
137 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
138 \global\pdfx@minorversion=6}% ISO 15930-8:2008
139 \DeclareOption{x-5g08}{\global\pdfx@true\def\xmp@Part{5}%
140 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
141 \global\pdfx@minorversion=6}% ISO 15930-8:2008
142 \DeclareOption{x-5n08}{\global\pdfx@true %\global\no@iccprofiletrue
143 \def\xmp@Part{5}\def\xmp@Conformance{n}\def\xmp@ReleaseDate{2008}%
144 \global\pdfx@minorversion=6 \pdfx@Xvn@message}% ISO 15930-8:2008
145 \DeclareOption{x-5pg08}{\global\pdfx@true\global\no@iccprofiletrue
146 \def\xmp@Part{5}\def\xmp@Conformance{pg}\def\xmp@ReleaseDate{2008}%
147 \global\pdfx@minorversion=6}% ISO 15930-8:2008
148 \DeclareOption{x-510}{\global\pdfx@true\def\xmp@Part{5}%
149 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2010}%
150 \global\pdfx@minorversion=6}% ISO 15930-8:2010
151 \DeclareOption{x-5g10}{\global\pdfx@true\def\xmp@Part{5}%
152 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2010}%
153 \global\pdfx@minorversion=6}% ISO 15930-8:2010
154 \DeclareOption{x-5n10}{\global\pdfx@true %\global\no@iccprofiletrue
155 \def\xmp@Part{5}\def\xmp@Conformance{n}\def\xmp@ReleaseDate{2010}%
156 \global\pdfx@minorversion=6 \pdfx@Xvn@message}% ISO 15930-8:2010
157 \DeclareOption{x-5pg10}{\global\pdfx@true\global\no@iccprofiletrue
158 \def\xmp@Part{5}\def\xmp@Conformance{pg}\def\xmp@ReleaseDate{2010}%
159 \global\pdfx@minorversion=6}% ISO 15930-8:2010
160 %%
161 %% PDF/E options
162 %%
163 \DeclareOption{e}{\global\pdfx@false\global\pdfx@true
164 \def\xmp@Part{1}\def\xmp@Conformance{}\def\xmp@ReleaseDate{2008}%
165 \gdef\thepdfminorversion{6}% same as e-1
166 }
167 \DeclareOption{e-1}{\global\pdfx@false\global\pdfx@true
168 \def\xmp@Part{1}\def\xmp@Conformance{}\def\xmp@ReleaseDate{2008}%
169 \gdef\thepdfminorversion{6}% ISO 24517-1:2008
170 }
171 %% PDF/UA options
172 %%
173 \let\xmp@PDFUA@empty
174 \DeclareOption{ua}{\global\pdfx@uatrue % ISO 14289-1:2012, 2014
175 \def\xmp@UAlevel{1}\let\xmp@PDFUA@relax}% same as ua-1
176 \DeclareOption{ua-1}{\global\pdfx@uatrue % ISO 14289-1:2012, 2014
177 \def\xmp@UAlevel{1}\let\xmp@PDFUA@relax}
178 %%
179 %% PDF/VT options
180 %%
181 \DeclareOption{vt-1}{\global\pdfx@true\global\pdfx@vttrue
182 \def\xmp@Part{4}\def\xmp@vtPart{1}\def\xmp@Conformance{}}%
183 \def\xmp@vtConformance{}\def\xmp@ReleaseDate{2010}%
184 \gdef\xmpMM@VersionID{1}%
185 \global\pdfx@minorversion=6 }
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
186 \DeclareOption{vt-2}{\global\pdfx@true\global\pdfx@vtrue
187   \global\no@iccprofiletrue \gdef\xmpMM@VersionID{1}%
188   \def\xmp@Part{5}\def\xmp@vtPart{2}\def\xmp@Conformance{pg}%
189   \def\xmp@vtConformance{}\def\xmp@ReleaseDate{2010}%
190   \global\pdfx@minorversion=6 }
191 \DeclareOption{vt-2s}{\global\pdfx@true\global\pdfx@vtrue
192   \global\no@iccprofiletrue \gdef\xmpMM@VersionID{1}%
193   \def\xmp@Part{5}\def\xmp@vtPart{2}\def\xmp@Conformance{pg}%
194   \def\xmp@vtConformance{s}\def\xmp@ReleaseDate{2010}%
195   \global\pdfx@minorversion=6 }
196
197 %% options to alter PDF minor version, in case needed in special circumstances
198 \DeclareOption{pdf12}{\global\pdfx@minorversion=2 }% 1999
199 \DeclareOption{pdf13}{\global\pdfx@minorversion=3 }% 2001 Acrobat 4 (ISBN 0-201-61588-6)
200 \DeclareOption{pdf14}{\global\pdfx@minorversion=4 }% 2003 Acrobat 5 (ISBN 0-201-75839-3)
201 \DeclareOption{pdf15}{\global\pdfx@minorversion=5 }% 2005 Acrobat 6
202 \DeclareOption{pdf16}{\global\pdfx@minorversion=6 }% 2006 Acrobat 7 (ISBN 0-321-30474-8)
203 \DeclareOption{pdf17}{\global\pdfx@minorversion=7 }% 2008 ISO 32000-1:2008
204
205 %% inhibits writing the XMP byte-order marker
206 \DeclareOption{noBOM}{\pdfx@noBOMtrue}
207 \DeclareOption{useBOM}{\pdfx@noBOMfalse}
208
209 %% options for language character macros in XMP metadata
210 \newif\ifcyrxmp
211 \newif\ifcyrKOIxm
212 \newif\ifgrxmp
213 \newif\ifgrkLGRxm
214 \newif\ifhebxmp
215 \newif\ifhebHEBxm
216 \newif\ifarbxmp
217 \newif\ifarmxm
218 \newif\ifarmSCIxmp
219 \newif\ifdevxm
220 \newif\ifvnmxm
221 \newif\iflatEXTxm
222 \newif\iflatLATxm
223 \newif\ifipaxmp
224 \newif\ifmathxm
225
226 \DeclareOption{latxm}{\global\latEXTxmtrue}
227 \DeclareOption{LATxm}{\global\latLATxmtrue\global\latEXTxmtrue}
228 \DeclareOption{cyrxm}{\global\cyrxmtrue}
229 \DeclareOption{KOIxmp}{\global\cyrKOIxmptrue\global\cyrxmtrue}
230 \DeclareOption{grxm}{\global\grxmtrue}
231 \DeclareOption{LGRxm}{\global\grkLGRxmtrue\global\grxmtrue}
232 \DeclareOption{hebxmp}{\global\hebxmptrue}
233 \DeclareOption{HEBxm}{\global\hebHEBxmtrue\global\hebxmptrue}
234 \DeclareOption{arbxmp}{\global\arbxmptrue}
235 \DeclareOption{armxm}{\global\armxmtrue}
236 \DeclareOption{AR8xm}{\global\armSCIxmptrue\global\armxmtrue}
237 \DeclareOption{devxm}{\global\devxmtrue}
```

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```
238 \DeclareOption{vnmxmp}{\global\vnmxmpttrue}
239 \DeclareOption{ipaxmp}{\global\ipaxmpttrue\global\latEXTxmpttrue}
240 \DeclareOption{mathxmp}{\global\mathxmpttrue\global\grkxmpttrue}
241
242 %% all the above
243 \DeclareOption{allxmp}{%
244   \global\cyrxmpttrue
245   \global\cyrkOIxmpttrue
246   \global\grkxmpttrue
247   \global\grkLGRxmpttrue
248   \global\hebxmpttrue
249   \global\hebHEBxmpttrue
250   \global\arbxmpttrue
251   \global\armxmpttrue
252   \global\armSCIxmpttrue
253   \global\devxmpttrue
254   \global\vnmxmpttrue
255   \global\latEXTxmpttrue
256   \global\latLATxmpttrue
257   \global\vnmxmpttrue
258   \global\ipaxmpttrue
259   \global\mathxmpttrue
260   \global\let\pdfx@useactivespacestrue\pdfx@useactivespacesfalse
261 }
262
263 \newif\ifpdfx@useactivespaces
264
265 \ExecuteOptions{noBOM,a-1b}
266 \ProcessOptions
267
268 \ifpdfx@ua\ifpdfx@x\else
269   \expandafter\if\xmp@Conformance A\else
270     \pdfx@ErrorWarning{PDF/UA requires 'Tagged PDF' for any structure.^^J
271     Then PDF/A Conformance must be 'a'}%
272     {Use option 'a-\xmp@Part a'}%
273     {; continuing with a likely invalid document}%
274     {, or continue for a likely invalid document}%
275     %% \gdef\xmp@Conformance{A}% do we want this?
276 \fi\fi\fi
277
278 \expandafter\ifx\csname pdflastobj\endcsname\relax
279 \else
280   \ifnum\pdflastobj >\z@ % pdftex has already written objects
281   \ifnum\pdfx@minorversion=\pdfminorversion\else
282     \PackageError{pdfx}%
283       {^^J(pdfx) Cannot change the \string\pdfminorversion^^J%
284       (pdfx) PDF version remains at 1.\the\pdfminorversion.^^J%
285       (pdfx) Use \string\pdfminorversion=\the\pdfx@minorversion\space
286       before \string\documentclass}%
287     {(pdfx) Another package or document-class has written objects into the PDF.^^J%
288     (pdfx) Hit return to continue with PDF version 1.\the\pdfminorversion.%
289     }%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
290 \global\pdfx@minorversion=\the\pdfminorversion
291 \fi
292 \else
293 \global\pdfminorversion\pdfx@minorversion
294 \fi
295 \fi
296
297 \expandafter\ifx\csname thepdfminorversion\endcsname\relax
298 \expandafter\ifx\csname pdfminorversion\endcsname\relax
299 \else
300 \xdef\thepdfminorversion{\the\pdfminorversion}
301 \fi\fi
302
303 \expandafter\ifx\csname pdfminorversion\endcsname\relax
304 \gdef\thepdfminorversion{4}% assumed with XeTeX
305 \def\pdf@minorversion@xetex=#1{\gdef\thepdfminorversion{#1}}%
306 \let\pdfminorversion\pdf@minorversion@xetex
307 \else
308 \ifnum\pdfminorversion < 4\relax
309 \ifpdfx@x
310 % more testing needed with PDF/X
311 \else
312 \pdfminorversion=4\relax % assumed for PDF/A ; options may change this for PDF/X
313 \gdef\thepdfminorversion{4}%
314 \fi
315 \else
316 \ifnum\pdfminorversion<\thepdfminorversion\relax
317 \global\pdfminorversion=\thepdfminorversion\relax
318 \fi
319 \fi
320 \fi
321 \expandafter\ifx\csname pdfresetpageorigin\endcsname\relax\else
322 \pdfresetpageorigin=0
323 \fi
324
325
326 \newif\ifpdfx@nopdfinfo
327 \ifmathxmp\pdfx@nopdfinfotrue
328 \else
329 \iflatLATxmp\pdfx@nopdfinfotrue
330 \else
331 \ifgrkLGRxmp\pdfx@nopdfinfotrue
332 \else
333 \ifhebHEBxmp\pdfx@nopdfinfotrue
334 \else
335 \ifcyrK0Ixm\pdfx@nopdfinfotrue
336 \else
337 \ifarmSCIxm\pdfx@nopdfinfotrue
338 \fi\fi\fi\fi\fi\fi
339
340 \iflatLATxmp\pdfx@useactivespacestrue\fi
341 \ifgrkLGRxmp\pdfx@useactivespacestrue\fi
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
342 \ifhebrew\xmp\pdfx@useactivespacestrue\fi
343 \ifcyrk0I\xmp\pdfx@useactivespacestrue\fi
344 \ifarmSCII\xmp\pdfx@useactivespacestrue\fi
345
346 \newif\ifpdfx@transliterated
347 \ifgrkLGR\xmp\pdfx@transliteratedtrue\fi
348 \ifhebrew\xmp\pdfx@transliteratedtrue\fi
349 \ifarmSCII\xmp\pdfx@transliteratedtrue\fi
350
351 \RequirePackage{iftex}
352 \RequirePackage{ifpdf}
353 %% Support for pdfTeX primitives when using XeTeX:
354 \RequirePackage{ifxetex}
355 \ifxetex
356   \def\pdfx@pages@xetex#1{\special{pdf:put @pages <<#1>>}}
357   \def\pdfx@docinfo@xetex#1{\special{pdf:put @docinfo <<#1>>}}
358   \def\pdfx@catalog@xetex#1{\special{pdf:put @catalog <<#1>>}}
359   \def\pdfx@mapline@xetex#1{}
360   \def\pdf@compress@xetex=#1{}
361 %%
362   \let\pdfpageattr\pdfx@pages@xetex
363   \let\pdfinfo\pdfx@docinfo@xetex
364   \let\pdfcatalog\pdfx@catalog@xetex
365   \let\pdfmapline\pdfx@mapline@xetex
366   \let\pdfcompresslevel\pdf@compress@xetex
367   \let\pdfobjcompresslevel\pdf@compress@xetex
368 \fi
369
370 %%\newif\ifpdfx@pdfmark % control future support for dvips
371
372 \RequirePackage{ifluatex}
373 \ifluatex
374   \IfFileExists{luatex85.sty}{% 2016+
375     \RequirePackage{luatex85}%
376     \edef\pdfcreationdate{\pdfcreationdate}%
377   }{% earlier versions
378   }%
379   \RequirePackage{pdfTeXcmds}%
380   \let\pdfx@mdfivesum\pdf@mdfivesum
381   \let\pdfescapestring\pdf@escapestring
382 \else
383   \ifxetex
384     \usepackage{everyshi}%
385     \expandafter\ifx\csname mdfivesum\endcsname\relax
386       % too early a version of XeTeX
387       \let\pdfx@mdfivesum\relax
388     \else
389       % since mid-2015
390       \let\pdfx@mdfivesum\mdfivesum
391     \fi
392   \else
393     \let\pdfx@mdfivesum\pdfmdfivesum
```



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```
394 \fi
395 \fi
396 \def\pdfx@encodingfile{l8u-penc.def}
397
398 \expandafter\ifx\csname pdftexbanner\endcsname\relax
399 \expandafter\ifx\csname luatexbanner\endcsname\relax
400 \else % luatex85
401 \let\pdftexbanner\luatexbanner
402 \fi
403 \else % pdfTeX, but which version ???
404 {\endlinechar=-1
405 \everyeof{\noexpand}%
406 \xdef\pdfx@bannerstring{\expandafter\scantokens\expandafter{\pdftexbanner}}
407 }%
408 \def\pdfx@testbannerstr{%
409 This is pdfTeX, Version 3.14159265-2.6-1.40.15 (TeX Live 2014/dev)
410 kpathsea version 6.2.0dev}%
411 \ifx\pdfx@bannerstring\pdfx@testbannerstr
412 \typeout{This version of pdfTeX cannot write out upper-range character bytes,
413 128-255.}%
414 \typeout{Any UTF-8 Unicode characters in the Metadata will not be written
415 correctly.}%
416 \typeout{Please update to a more stable version of pdfTeX.^^J}%
417 \fi
418 \fi
419
420 %% How to support XeTeX here ?
421 \ifpdfx@x
422 \pdfobjcompresslevel=0 \relax
423 \expandafter\ifx\csname pdfinterwordspaceoff\endcsname\relax\else
424 \pdfinterwordspaceoff
425 \let\pdfinterwordspaceon\pdfinterwordspaceoff
426 \let\pdfinterwordspace\relax
427 \fi
428 \expandafter\ifx\csname pdfgeninterwordspace\endcsname\relax\else
429 \pdfgeninterwordspace=0 \relax
430 \fi
431 \begingroup
432 \dimen0=0.996264009963\paperwidth\relax
433 \edef\pdfx@mwidth{\strip@pt\dimen0}%
434 \advance\dimen0 -25\p@
435 \edef\pdfx@twidth{\strip@pt\dimen0}%
436 \dimen0=0.996264009963\paperheight\relax
437 \edef\pdfx@mheight{\strip@pt\dimen0}%
438 \advance\dimen0 -20\p@
439 \edef\pdfx@theight{\strip@pt\dimen0}%
440 \ifxetex
441 \xdef\pdfx@everypage@xetex{%
442 /MediaBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
443 /TrimBox[25 20 \pdfx@twidth\space \pdfx@theight]%
444 }%
445 \fi
```

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```
446 \edef\next{\endgroup\pdfpageattr{%
447 /MediaBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^J
448 %% /ArtBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^J
449 /BleedBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^J
450 /CropBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^J
451 /TrimBox[25 20 \pdfx@twidth\space \pdfx@theight]}
452 }\next
453 \ifxetex
454 \AtBeginDvi{%
455 \immediate\special{pdf:put @thispage <<\pdfx@everypage@xetex>>}}%
456 \EveryShipout{%
457 \immediate\special{pdf:put @thispage <<\pdfx@everypage@xetex>>}}%
458 \fi
459 \else
460 %% PDF/A-1b doesn't allow object compression
461 \ifnum\xmp@ReleaseDate=2005\relax
462 \expandafter\ifx\csname pdfobjcompresslevel\endcsname\relax
463 \else
464 \pdfobjcompresslevel=0\relax
465 \fi \fi
466 \fi
467 \ifxetex
468 %% How to support XeTeX here ?
469 \else
470 \ifnum\thepdfminorversion >3 \relax
471 \expandafter\ifx\csname pdfsuppresswarningdupmap\endcsname\relax
472 \expandafter\ifx\csname pdfmapline\endcsname\relax\else
473 \pdfmapline{+dummy-space <dummy-space.pfb>}
474 \fi
475 \else
476 \advance\pdfsuppresswarningdupmap 1
477 \pdfmapline{+dummy-space <dummy-space.pfb>}
478 \advance\pdfsuppresswarningdupmap -1
479 \fi
480 \expandafter\ifx\csname pdfgeninterwordspace\endcsname\relax\else
481 \pdfgeninterwordspace=1 \relax
482 \fi
483 \fi
484 \fi
485
486 \ifluatex\else\ifxetex\else
487 \@ifpackageloaded{inputenc}{%
488 }{%
489 \RequirePackage{inputenc}
490 % allow this to be loaded again cleanly
491 \expandafter\let\csname ver@inputenc.sty\endcsname\relax
492 }
493 \fi\fi
494
495 %% pseudo-declare the L8U encoding
496 \expandafter\let\csname L8U-cmd\expandafter\endcsname\csname OT1-cmd\endcsname
497 \@namedef{T@L8U}{}
```

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```
498 \@namedef{D@L8U}{}%
499 \@namedef{M@L8U}{}%
500
501 %% adjust to LaTeX's 2018 change to the default encoding
502 \expandafter\ifx\csname inputencodingname\endcsname\relax
503 \else
504 \def\pdfx@restoreencoding#1{%
505 \tempcnta=128
506 \loop
507 \catcode\tempcnta=13
508 \advance\tempcnta@ne
509 \ifnum\tempcnta<256
510 \repeat
511 \inputencoding{#1}%
512 }%
513 \AtEndOfPackage{\pdfx@restoreencoding\pdfx@inputencodingname}%
514 \let\pdfx@inputencodingname\inputencodingname
515 \let\pdfx@DeclareUnicodeCharacter\DeclareUnicodeCharacter
516 \UseRawInputEncoding
517 \fi
518 \InputIfFileExists{\pdfx@encodingfile}{}{}
519 \expandafter\ifx\csname pdfx@inputencodingname\endcsname\relax
520 \else
521 \let\inputencodingname\pdfx@inputencodingname
522 \let\DeclareUnicodeCharacter\pdfx@DeclareUnicodeCharacter
523 \let\DeclareFontEncoding\pdfx@DeclareFontEncoding@saved
524 \inputencoding{\inputencodingname}%
525 \fi
526
527 %%-----
528 %% Macros for reading XMP data with special catcodes. Usage:
529 %%
530 %% \xmp@parse{continuation}{data}
531 %%
532 %% The effect is to read the data with special catcodes: '<', '>', and
533 %% '&' are "active", and '^', '_ ', '#', '$', '~' are "other". The data
534 %% is then bound to the locally scoped name \@this, and the
535 %% continuation is called.
536 \def\xmp@parse#1{%
537 \begingroup
538 \catcode'\<=13\catcode'\>=13\catcode'\&=13\catcode'\^=12
539 \catcode'\_ =12\catcode'\#=12\catcode'\$=12\catcode'\~=12
540 \ifpdfx@useactivespaces\obeyspaces\fi % capture spaces as active characters
541 \xmp@doparse{#1}%
542 }
543 \def\afterxmp@parse{}% methods may change this
544 \def\xmp@doparse#1#2{%
545 \def\@this{#2}#1
546 \endgroup
547 % do any post-processing
548 \afterxmp@parse
549 \def\afterxmp@parse{}%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
550 }
551
552 %%-----
553 %% Local commands. They are only brought into scope during the reading
554 %% of xmpdata. Some fields can have a 'xml:lang' attribute; others must have.
555 %% LANG values as in: (BCP 47) https://tools.ietf.org/html/rfc5646#appendix-A
556 %%
557 \def\xmp@lang@Default{x-default}
558 \let\xmp@lang@Title\xmp@lang@Default
559 \let\xmp@lang@Author\xmp@lang@Default
560 \let\xmp@lang@Keywords\xmp@lang@Default
561 \let\xmp@lang@Subject\xmp@lang@Default
562 %%\def\xmp@lang@CreatorTool{\xmp@lang@Default}
563 \let\xmp@lang@Producer\xmp@lang@Default
564 %%\def\xmp@lang@Volume{\xmp@lang@Default}
565 %%\def\xmp@lang@Issue{\xmp@lang@Default}
566 \let\xmp@lang@Copyright\xmp@lang@Default
567 \let\xmp@lang@PublicationType\xmp@lang@Default
568 \let\xmp@lang@Publisher\xmp@lang@Default
569 \let\xmp@lang@Coverage\xmp@lang@Default
570 \let\xmp@lang@Contributor\xmp@lang@Default
571 \let\xmp@lang@Relation\xmp@lang@Default
572 %%% PRISM fields
573 \let\xmp@lang@CoverDisplayDate\xmp@lang@Default
574 \let\xmp@lang@JournalTitle\xmp@lang@Default
575 %%\def\xmp@lang@JournalNumber{\xmp@lang@Default}
576 %%% xmp: & xmpRights: fields
577 \let\xmp@lang@Advisory\xmp@lang@Default
578 \let\xmp@lang@Identifier\xmp@lang@Default
579 \let\xmp@lang@Nickname\xmp@lang@Default
580 \let\xmp@lang@Owner\xmp@lang@Default
581
582 %% some validators require a language attribute for
583 %% dc:title set via \Title
584 %% dc:description set via \Subject
585 %% dc:rights set via \Copyright
586 %% xmpRights:UsageTerms set via \Copyright
587 %%
588 {\catcode '\ " 12 \catcode'\: 12 \catcode'\= 12
589 \gdef\pdfx@xmp@checklang#1{%
590 \ifx #1\xmp@lang@Default\else\space xml:lang="#1"\fi}
591 \gdef\pdfx@xmp@strictlang#1{\space xml:lang="#1"}
592 }% end of \catcodes
593 \let\xmp@checklang\pdfx@xmp@checklang
594 \let\xmp@strictlang\pdfx@xmp@strictlang
595
596 \newcommand{\pdfx@Title}[1][\]{%
597 \ifx\relax#1\relax\else\gdef\xmp@lang@Title{#1}\fi
598 \xmp@parse{\global\let\xmp@Title\@this}}
599
600 %% allow for multiple authors, keywords and languages
601 %% also: contributor, date, relation, type, thumbnails
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
602 %% and AuthoritativeDomain, Advisory, Identifier, Owner
603 \newcommand{\pdfx@Author}[1][{}]{%
604   \ifx\relax#1\relax\else\gdef\xmp@lang@Author{#1}\fi
605   \def\afterxmp@parse{\let\Author\pdfx@extraAuthor}%
606   \xmp@parse{\global\let\xmp@Author\@this}}
607 \newcommand{\pdfx@Keywords}[1][{}]{%
608   \ifx\relax#1\relax\else\gdef\xmp@lang@Keywords{#1}\fi
609   \def\afterxmp@parse{\let\Keywords\pdfx@extraKeywords}%
610   \xmp@parse{\global\let\xmp@Keywords\@this}}
611 \newcommand{\pdfx@Language}{%
612   \def\afterxmp@parse{\let\Language\pdfx@extraLanguages}%
613   \xmp@parse{\global\let\xmp@Language\@this}}
614
615 \newcommand{\pdfx@AuthoritativeDomain}{%
616   \def\afterxmp@parse{\let\AuthoritativeDomain\pdfx@extraAuthoritativeDomain}%
617   \xmp@parse{\global\let\xmp@AuthoritativeDomain\@this}}
618 \newcommand{\pdfx@Date}{%
619   \def\afterxmp@parse{\let\Date\pdfx@extraDate}%
620   \xmp@parse{\global\let\xmp@Date\@this}}
621 \newcommand{\pdfx@Contributor}[1][{}]{%
622   \ifx\relax#1\relax\else\gdef\xmp@lang@Contributor{#1}\fi
623   \def\afterxmp@parse{\let\Contributor\pdfx@extraContributor}%
624   \xmp@parse{\global\let\xmp@Contributor\@this}}
625 \newcommand{\pdfx@Relation}[1][{}]{%
626   \ifx\relax#1\relax\else\gdef\xmp@lang@Relation{#1}\fi
627   \def\afterxmp@parse{\let\Relation\pdfx@extraRelation}%
628   \xmp@parse{\global\let\xmp@Relation\@this}}
629 %% \newcommand{\pdfx@Type}[1][{}]{%
630 %%   \ifx\relax#1\relax\else\gdef\xmp@lang@Type{#1}\fi
631 %%   \def\afterxmp@parse{\let\Type\pdfx@extraType}%
632 %%   \xmp@parse{\global\let\xmp@Type\@this}}
633
634 \newcommand{\pdfx@Advisory}[1][{}]{%
635   \ifx\relax#1\relax\else\gdef\xmp@lang@Advisory{#1}\fi
636   \def\afterxmp@parse{\let\Advisory\pdfx@extraAdvisory}%
637   \xmp@parse{\global\let\xmp@Advisory\@this}}
638 \newcommand{\pdfx@Identifier}[1][{}]{%
639   \ifx\relax#1\relax\else\gdef\xmp@lang@Identifier{#1}\fi
640   \def\afterxmp@parse{\let\Identifier\pdfx@extraIdentifier}%
641   \xmp@parse{\global\let\xmp@Identifier\@this}}
642 \newcommand{\pdfx@Thumbnails}{%
643   \def\afterxmp@parse{\let\Thumbnails\pdfx@extraThumbnails}%
644   \xmp@parse{\global\let\xmp@Thumbnails\@this}}
645
646 \newcommand{\pdfx@Owner}[1][{}]{%
647   \ifx\relax#1\relax\else\gdef\xmp@lang@Owner{#1}\fi
648   \def\afterxmp@parse{\let\Owner\pdfx@extraOwner}%
649   \xmp@parse{\global\let\xmp@Owner\@this}}
650
651 {\obeyspaces%
652   \ifpdfx@useactivespaces\gdef\pdfx@insert@sep{\sep }%
653   \else\gdef\pdfx@insert@sep{\sep}\fi%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
654 }
655 \newcommand{\pdfx@extraAuthor}[1][{}]{%
656   \ifx\relax#1\relax
657     \expandafter\expandafter\expandafter\gdef
658       \expandafter\expandafter\expandafter\xmp@Author
659         \expandafter\expandafter\expandafter{%
660           \expandafter\xmp@Author\pdfx@insert@sep}%
661   \else
662     \expandafter\expandafter\expandafter\gdef
663       \expandafter\expandafter\expandafter\xmp@Author
664         \expandafter\expandafter\expandafter{%
665           \expandafter\xmp@Author\pdfx@insert@sep[#1]}%
666   \fi
667   \def\afterxmp@parse{%
668     \expandafter\expandafter\expandafter\gdef
669       \expandafter\expandafter\expandafter\xmp@Author
670       \expandafter\expandafter\expandafter{%
671         \expandafter\xmp@Author\xmp@extraAuthor}%
672     }%
673   \xmp@parse{\global\let\xmp@extraAuthor\@this}%
674 }%
675 \newcommand{\pdfx@extraKeywords}[1][{}]{%
676   \ifx\relax#1\relax
677     \expandafter\expandafter\expandafter\gdef
678       \expandafter\expandafter\expandafter\xmp@Keywords
679         \expandafter\expandafter\expandafter{%
680           \expandafter\xmp@Keywords\pdfx@insert@sep}%
681   \else%
682     \expandafter\expandafter\expandafter\gdef
683       \expandafter\expandafter\expandafter\xmp@Keywords
684         \expandafter\expandafter\expandafter{%
685           \expandafter\xmp@Keywords\pdfx@insert@sep[#1]}%
686   \fi%
687   \def\afterxmp@parse{%
688     \expandafter\expandafter\expandafter\gdef
689       \expandafter\expandafter\expandafter\xmp@Keywords
690       \expandafter\expandafter\expandafter{%
691         \expandafter\xmp@Keywords\xmp@extraKeywords}}%
692   \xmp@parse{\global\let\xmp@extraKeywords\@this}%
693 }%
694 \newcommand{\pdfx@extraLanguages}{%
695   \expandafter\expandafter\expandafter\gdef
696     \expandafter\expandafter\expandafter\xmp@Language
697       \expandafter\expandafter\expandafter{%
698         \expandafter\xmp@Language\pdfx@insert@sep}%
699   \def\afterxmp@parse{%
700     \expandafter\expandafter\expandafter\gdef
701       \expandafter\expandafter\expandafter\xmp@Language
702       \expandafter\expandafter\expandafter{%
703         \expandafter\xmp@Language\xmp@extraLanguages}}%
704   \xmp@parse{\global\let\xmp@extraLanguages\@this}%
705 }%
```



# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
706
707 \newcommand{\pdfx@extraContributor}[1][{}]{%
708   \ifx\relax#1\relax
709     \expandafter\expandafter\expandafter\gdef
710       \expandafter\expandafter\expandafter\xmp@Contributor
711         \expandafter\expandafter\expandafter{%
712           \expandafter\xmp@Contributor\pdfx@insert@sep}%
713   \else
714     \expandafter\expandafter\expandafter\gdef
715       \expandafter\expandafter\expandafter\xmp@Contributor
716         \expandafter\expandafter\expandafter{%
717           \expandafter\xmp@Contributor\pdfx@insert@sep[#1]}%
718   \fi
719   \def\afterxmp@parse{%
720     \expandafter\expandafter\expandafter\gdef
721       \expandafter\expandafter\expandafter\xmp@Contributor
722         \expandafter\expandafter\expandafter{%
723           \expandafter\xmp@Contributor\xmp@extraContributor}%
724     }%
725   \xmp@parse{\global\let\xmp@extraContributor\@this}%
726 }%
727
728 \newcommand{\pdfx@extraAuthoritativeDomain}{%
729   \expandafter\expandafter\expandafter\gdef
730     \expandafter\expandafter\expandafter\xmp@AuthoritativeDomain
731       \expandafter\expandafter\expandafter{%
732         \expandafter\xmp@AuthoritativeDomain\pdfx@insert@sep}%
733   \def\afterxmp@parse{%
734     \expandafter\expandafter\expandafter\gdef
735       \expandafter\expandafter\expandafter\xmp@AuthoritativeDomain
736         \expandafter\expandafter\expandafter{%
737           \expandafter\xmp@AuthoritativeDomain\xmp@extraAuthoritativeDomain}%
738     }%
739   \xmp@parse{\global\let\xmp@extraAuthoritativeDomain\@this}%
740 }%
741
742 \newcommand{\pdfx@extraDate}{%
743   \expandafter\expandafter\expandafter\gdef
744     \expandafter\expandafter\expandafter\xmp@Date
745       \expandafter\expandafter\expandafter{%
746         \expandafter\xmp@Date\pdfx@insert@sep}%
747   \def\afterxmp@parse{%
748     \expandafter\expandafter\expandafter\gdef
749       \expandafter\expandafter\expandafter\xmp@Date
750         \expandafter\expandafter\expandafter{%
751           \expandafter\xmp@Date\xmp@extraDate}%
752     }%
753   \xmp@parse{\global\let\xmp@extraDate\@this}%
754 }%
755
756 \newcommand{\pdfx@extraRelation}[1][{}]{%
757   \ifx\relax#1\relax
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
758 \expandafter\expandafter\expandafter\gdef
759 \expandafter\expandafter\expandafter\xmp@Relation
760 \expandafter\expandafter\expandafter{%
761 \expandafter\xmp@Relation\pdfx@insert@sep}%
762 \else
763 \expandafter\expandafter\expandafter\gdef
764 \expandafter\expandafter\expandafter\xmp@Relation
765 \expandafter\expandafter\expandafter{%
766 \expandafter\xmp@Relation\pdfx@insert@sep[#1]]}%
767 \fi
768 \def\afterxmp@parse{%
769 \expandafter\expandafter\expandafter\gdef
770 \expandafter\expandafter\expandafter\xmp@Relation
771 \expandafter\expandafter\expandafter{%
772 \expandafter\xmp@Relation\xmp@extraRelation}%
773 }%
774 \xmp@parse{\global\let\xmp@extraRelation\@this}%
775 }%
776
777 %%\newcommand{\pdfx@extraType}[1][{}]{%
778 %%% \show\xmp@Type
779 %% \ifx\relax#1\relax
780 %% \expandafter\expandafter\expandafter\gdef
781 %% \expandafter\expandafter\expandafter\xmp@Type
782 %% \expandafter\expandafter\expandafter{%
783 %% \expandafter\xmp@Type\pdfx@insert@sep}%
784 %% \else
785 %% \expandafter\expandafter\expandafter\gdef
786 %% \expandafter\expandafter\expandafter\xmp@Type
787 %% \expandafter\expandafter\expandafter{%
788 %% \expandafter\xmp@Type\pdfx@insert@sep[#1]]}%
789 %% \fi
790 %% \def\afterxmp@parse{%
791 %% \expandafter\expandafter\expandafter\gdef
792 %% \expandafter\expandafter\expandafter\xmp@Type
793 %% \expandafter\expandafter\expandafter{%
794 %% \expandafter\xmp@Type\xmp@extraType}%
795 %% %\show\xmp@Type
796 %% }%
797 %% \xmp@parse{\global\let\xmp@extraType\@this}%
798 %% }%
799
800 \newcommand{\pdfx@extraAdvisory}[1][{}]{%
801 \ifx\relax#1\relax
802 \expandafter\expandafter\expandafter\gdef
803 \expandafter\expandafter\expandafter\xmp@Advisory
804 \expandafter\expandafter\expandafter{%
805 \expandafter\xmp@Advisory\pdfx@insert@sep}%
806 \else
807 \expandafter\expandafter\expandafter\gdef
808 \expandafter\expandafter\expandafter\xmp@Advisory
809 \expandafter\expandafter\expandafter{%
```

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```
810 \expandafter\xmp@Advisory\pdfx@insert@sep[#1]]%
811 \fi
812 \def\afterxmp@parse{%
813 \expandafter\expandafter\expandafter\gdef
814 \expandafter\expandafter\expandafter\xmp@Advisory
815 \expandafter\expandafter\expandafter{%
816 \expandafter\xmp@Advisory\xmp@extraAdvisory}%
817 }%
818 \xmp@parse{\global\let\xmp@extraAdvisory\@this}%
819 }%
820
821 \newcommand{\pdfx@extraIdentifier}[1][{}]{%
822 \ifx\relax#1\relax
823 \expandafter\expandafter\expandafter\gdef
824 \expandafter\expandafter\expandafter\xmp@Identifier
825 \expandafter\expandafter\expandafter{%
826 \expandafter\xmp@Identifier\pdfx@insert@sep}%
827 \else
828 \expandafter\expandafter\expandafter\gdef
829 \expandafter\expandafter\expandafter\xmp@Identifier
830 \expandafter\expandafter\expandafter{%
831 \expandafter\xmp@Identifier\pdfx@insert@sep[#1]]%
832 \fi
833 \def\afterxmp@parse{%
834 \expandafter\expandafter\expandafter\gdef
835 \expandafter\expandafter\expandafter\xmp@Identifier
836 \expandafter\expandafter\expandafter{%
837 \expandafter\xmp@Identifier\xmp@extraIdentifier}%
838 }%
839 \xmp@parse{\global\let\xmp@extraIdentifier\@this}%
840 }%
841
842 \newcommand{\pdfx@extraThumbnails}[1][{}]{%
843 \ifx\relax#1\relax
844 \expandafter\expandafter\expandafter\gdef
845 \expandafter\expandafter\expandafter\xmp@Thumbnails
846 \expandafter\expandafter\expandafter{%
847 \expandafter\xmp@Thumbnails\pdfx@insert@sep}%
848 \else
849 \expandafter\expandafter\expandafter\gdef
850 \expandafter\expandafter\expandafter\xmp@Thumbnails
851 \expandafter\expandafter\expandafter{%
852 \expandafter\xmp@Thumbnails\pdfx@insert@sep[#1]]%
853 \fi
854 \def\afterxmp@parse{%
855 \expandafter\expandafter\expandafter\gdef
856 \expandafter\expandafter\expandafter\xmp@Thumbnails
857 \expandafter\expandafter\expandafter{%
858 \expandafter\xmp@Thumbnails\xmp@extraThumbnails}%
859 }%
860 \xmp@parse{\global\let\xmp@extraThumbnails\@this}%
861 }%
```

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```
862
863 \newcommand{\pdfx@extraOwner}[1][{}]{%
864   \ifx\relax#1\relax
865     \expandafter\expandafter\expandafter\gdef
866       \expandafter\expandafter\expandafter\xmp@Owner
867         \expandafter\expandafter\expandafter{%
868           \expandafter\xmp@Owner\pdfx@insert@sep}%
869   \else
870     \expandafter\expandafter\expandafter\gdef
871       \expandafter\expandafter\expandafter\xmp@Owner
872         \expandafter\expandafter\expandafter{%
873           \expandafter\xmp@Owner\pdfx@insert@sep[#1]}%
874   \fi
875   \def\afterxmp@parse{%
876     \expandafter\expandafter\expandafter\gdef
877       \expandafter\expandafter\expandafter\xmp@Owner
878         \expandafter\expandafter\expandafter{%
879           \expandafter\xmp@Owner\xmp@extraOwner}%
880     }%
881   \xmp@parse{\global\let\xmp@extraOwner\@this}%
882 }%
883
884 \newcommand{\pdfx@Subject}[1][{}]{%
885   \ifx\relax#1\relax\else\gdef\xmp@lang@Subject{#1}\fi
886   \xmp@parse{\global\let\xmp@Subject\@this}}
887 \newcommand{\pdfx@Producer}[1][{}]{%
888   \ifx\relax#1\relax\else\gdef\xmp@lang@Producer{#1}\fi
889   \xmp@parse{\global\let\xmp@Producer\@this}}
890 \newcommand{\pdfx@Publisher}[1][{}]{%
891   \ifx\relax#1\relax\else\gdef\xmp@lang@Publisher{#1}\fi
892   \xmp@parse{\global\let\xmp@Publisher\@this}}
893 \newcommand{\pdfx@Copyright}[1][{}]{%
894   \ifx\relax#1\relax\else\gdef\xmp@lang@Copyright{#1}\fi
895   \xmp@parse{\global\let\xmp@Copyright\@this%
896     \ifx\xmp@Copyrighted\@empty\gdef\xmp@Copyrighted{True}\fi}}
897
898 \newcommand{\pdfx@Coverage}[1][{}]{%
899   \ifx\relax#1\relax\else\gdef\xmp@lang@Coverage{#1}\fi
900   \xmp@parse{\global\let\xmp@Coverage\@this}}
901
902 %% PRISM Text fields
903 \newcommand{\pdfx@CoverDisplayDate}[1][{}]{%
904   \ifx\relax#1\relax\else\gdef\xmp@lang@CoverDisplayDate{#1}\fi
905   \xmp@parse{\global\let\xmp@CoverDisplayDate\@this}}
906 \newcommand{\pdfx@JournalTitle}[1][{}]{%
907   \ifx\relax#1\relax\else\gdef\xmp@lang@JournalTitle{#1}\fi
908   \ifx\xmp@PublicationType\@empty\gdef\xmp@PublicationType{journal}\fi
909   \xmp@parse{\global\let\xmp@JournalTitle\@this}}
910
911 %% Uses PRISM Controlled Vocabulary:
912 %%   http://prismstandard.org/vocabularies/3.0/aggregationtype.xml
913 %%   blog, book, bookazine, catalog, feed, journal, magazine, manual
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
914 %% newsletter, newspaper, other, report, pamphlet, vook, whitepaper
915 %%
916 \newcommand{\pdfx@PublicationType}[1][]{%
917   \ifx\relax#1\relax\else\gdef\xmp@lang@PublicationType{#1}\fi
918   \xmp@parse{\global\let\xmp@PublicationType\@this}}
919
920 \def\pdfx@localcommands{
921   \let\Title\pdfx@Title
922   \let\Author\pdfx@Author
923   \let\Keywords\pdfx@Keywords
924   \let\Subject\pdfx@Subject
925   \let\Language\pdfx@Language
926   \def\CreatorTool{\xmp@parse{\global\let\xmp@CreatorTool\@this}}
927   \let\Producer\pdfx@Producer
928   \def\Volume{\xmp@parse{\global\let\xmp@Volume\@this}}
929   \def\Issue{\xmp@parse{\global\let\xmp@Issue\@this}}
930   \let\CoverDisplayDate\pdfx@CoverDisplayDate
931   \def\CoverDate{\xmp@parse{\global\let\xmp@CoverDate\@this}}
932   \let\Copyright\pdfx@Copyright
933   \def\CopyrightURL{\xmp@parse{\global\let\xmp@CopyrightURL\@this%
934     \ifx\xmp@Copyrighted\@empty\gdef\xmp@Copyrighted{True}\fi}}
935   \def\Copyrighted{\xmp@parse{\global\let\xmp@Copyrighted\@this}}
936   \def\Doi{\xmp@parse{\global\let\xmp@Doi\@this}}
937   \def\ISBN{\xmp@parse{\global\let\xmp@ISBN\@this}}
938   \def\URLlink{\xmp@parse{\global\let\xmp@URL\@this}}
939   \def\Lastpage{\xmp@parse{\global\let\xmp@Lastpage\@this}}
940   \def\Firstpage{\xmp@parse{\global\let\xmp@Firstpage\@this}}
941   \let\PublicationType\pdfx@PublicationType
942   \let\Journaltitle\pdfx@JournalTitle
943   \def\Journalnumber{\xmp@parse{\global\let\xmp@Journalnumber\@this}}
944   \let\Publisher\pdfx@Publisher
945   \let\Coverage\pdfx@Coverage
946   \def\Source{\xmp@parse{\global\let\xmp@Source\@this}}
947   \let\Contributor\pdfx@Contributor
948   \let\Date\pdfx@Date
949   \let\Relation\pdfx@Relation
950   \let\Advisory\pdfx@Advisory
951   \def\BaseURL{\xmp@parse{\global\let\xmp@BaseURL\@this}}
952   \let\Identifier\pdfx@Identifier
953   \let\Nickname\pdfx@Nickname
954   \let\Thumbnails\pdfx@Thumbnails
955   \let\Owner\pdfx@Owner
956   \def\CertificateURL{\xmp@parse{\global\let\xmp@CertificateURL\@this}}
957   \def\MMversionID{\xmp@parse{\global\let\xmp@MM@versionID\@this}}
958 %% \let\Type\pdfx@Type
959 %%
960 %% currently unused; for backward compatibility only
961 \let\AuthoritativeDomain\pdfx@AuthoritativeDomain
962 \let\Creator\CreatorTool % for backward compatibility
963 \let\Org\Publisher % for backward compatibility
964 \let\WebStatement\CopyrightURL % for backward compatibility
965 }
```

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```
966
967 %%-----
968 %% The following characters and markup can be used within the XMP data
969 %% defined by \Author, \Title, and so on.
970 %%
971 %% * All printable non-whitespace ASCII characters except
972 %% ' ', '{', '}', '\ ' can be used as themselves.
973 %%
974 %% * All printable non-whitespace UTF-8 encoded Unicode characters
975 %% from the basic multilingual plane can be used as themselves.
976 %%
977 %% * As usual, consecutive whitespace characters are contracted to a
978 %% single space. Whitespace after a macro such as \copyright is
979 %% ignored. Blank lines are not permitted.
980 %%
981 %% * The following markup can be used:
982 %% '\ ' - a literal space (for example after a macro)
983 %% \% - a literal '%'
984 %% \{ - a literal '{'
985 %% \} - a literal '}'
986 %% \backslash - a literal '\'
987 %% \copyright - the (c) copyright symbol
988 %%
989 %% \sep - only permitted within \Author, \Keywords, \Publisher.
990 %%
991 %% * For backward compatibility, \& and \TextCopyright are also
992 %% provided. Their use is deprecated.
993
994 %%-----
995 %% The macro \pdfx@actives binds the active characters
996 %% '&', '<', and '>' to \pdfx@amp, \pdfx@lt, and \pdfx@gt,
997 %% respectively, without actually making them active.
998 \begingroup
999 \catcode'\<=13
1000 \catcode'\>=13
1001 \catcode'\&=13
1002 \gdef\pdfx@actives{
1003 \def&{\pdfx@amp}
1004 \def<{\pdfx@lt}
1005 \def>{\pdfx@gt}
1006 }
1007 \endgroup
1008
1009 %%-----
1010 %% Markup bindings to be used during XMP generation.
1011
1012 {%
1013 \catcode'\<=12 \catcode'\>=12 \catcode'\/=12 \catcode'\:=12 \catcode'\ "=12
1014 \obeyspaces\ifpdfx@useactivespaces%
1015 \gdef\pdfx@sep {\pdfx@check@lang}%
1016 \else%
1017 \gdef\pdfx@sep{\pdfx@check@lang}%
1018 }
```



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```
1018 \fi%
1019 \xdef\pdfx@sep@nolang{</rdf:li>^^J      <rdf:li>}%
1020 \xdef\pdfx@sep@lang[#1]{</rdf:li>^^J      <rdf:li xml:lang="#1">}%
1021 }% end of \obeyspaces and \catcode ....
1022
1023 \def\pdfx@check@lang#1{%
1024   \ifx[#1\expandafter\@firstoftwo
1025   \else\expandafter\@secondoftwo\fi
1026   {\pdfx@sep@lang#1}{\pdfx@sep@nolang#1}}
1027
1028 \def\pdfx@xmpmarkup{%
1029   \pdfx@actives
1030   \edef\@amp{\expandafter\@gobble\string\&}%
1031   \edef\@hash{\expandafter\@gobble\string\#}%
1032   \edef\ { \expandafter\@gobble\string\ }%
1033   \edef\%{\expandafter\@gobble\string\}%
1034   \edef\{{\expandafter\@gobble\string\{}%
1035   \edef\}{\expandafter\@gobble\string\}}%
1036   \edef\backslash{\expandafter\@gobble\string\\}%
1037   \def\@unicode##1{\@amp\@hash x##1;}%
1038   \def\pdfx@amp{\@unicode{0026}}%
1039   \def\pdfx@lt{\@unicode{003c}}%
1040   \def\pdfx@gt{\@unicode{003e}}%
1041   \def\copyright{\@unicode{00A9}}%
1042   \let&\pdfx@amp      % for backward compatibility
1043   \let\TextCopyright\copyright % for backward compatibility
1044   \let\sep\pdfx@sep
1045   \pdfx@xmpunimarkup % only need this when writing XMP
1046   \the\pdfxsafeforxmp@toks
1047 }
1048
1049 %% cope with active spaces with LGR encoding
1050 %% and the spaces written out with \IeC in KOI8-r
1051 %% It's possible to have both together.
1052 \def\liixu@IeC#1#{\liixu@IeCi}
1053 \def\liixu@IeCi#1{\liixu@IeCii#1}
1054 \def\liixu@IeCii#1#2{#1}
1055 \def\liixu@enableIeC{\ifpdfx@useactivespaces
1056   \let\IeC\liixu@IeC\else\def\IeC##1{##1}\fi}
1057 \def\liixu@numberline#1#{\liixu@numberlinei}
1058 \def\liixu@numberlinei#1{\liixu@numberlineii#1}
1059 \def\liixu@numberlineii#1{\textLF #1. }
1060 \def\liixu@enablenumberline{\ifpdfx@useactivespaces
1061   \let\numberline\liixu@numberline
1062   \else\def\numberline##1{\textLF ##1. }\fi}
1063
1064 \def\pdfx@xmpunimarkup{%
1065   \liixu@enableIeC
1066   \liixu@enablenumberline
1067   \def\empty{}% used in LICR patterns
1068   \LIIXUscriptcommands
1069   \LIIXUtipacommands
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1070 \LIIXUmapTeXnames
1071 %% from Hyperref's psdextra.def
1072 \csname psdmapshortnames\endcsname
1073 \csname psdaliasnames\endcsname
1074 %% from lu8enc.def
1075 \csname LIIXUmapmathletterlikes\endcsname
1076 \csname LIIXUmapmathspaces\endcsname
1077 \iflatLATxmp
1078 \LIIXUmaplatinchars
1079 \LIIXUcancelfontswitches
1080 \fi
1081 \ifmathxmp
1082 \let\(\textinlinemath
1083 \let\[\textdisplaymath
1084 \LIIXUmapmathaccents
1085 \LIIXUmapisomathgreek
1086 \LIIXUmapmatharrowsA
1087 \LIIXUmapmathoperatorsA
1088 \LIIXUmapmathoperatorsB
1089 \LIIXUmapmiscmathsymbolsA
1090 \LIIXUmapsupparrowsA
1091 \LIIXUmapsupparrowsB
1092 \LIIXUmapmiscmathsymbolsB
1093 \LIIXUmapsuppmathoperators
1094 \LIIXUmapunimathgreek
1095 \LIIXUmapmathalphabets
1096 \fi
1097 \ifarbxmp \LIIXUmaparabicletters\fi
1098 \ifarmxmp \LIIXUmaparmenianletters\fi
1099 \ifdevxmp \LIIXUmapdevaccents\fi
1100 \ifgrxmp \LIIXUmapgreekletters\fi
1101 \ifhebxmp \LIIXUmaphebrewletters\fi
1102 }
1103
1104 %% In case macros are used in XMP Metadata, need a way to map these
1105 %% to simple text, rather than specific font characters, or whatever:
1106 \newtoks\pdfxsafeforxmp@toks
1107 \def\pdfxEnableCommands{% user command
1108 \begingroup
1109 \ifpdfx@useactivespaces\obeyspaces\fi
1110 \pdfx@EnableCommands
1111 }
1112 \def\pdfx@EnableCommands#1{% internal command
1113 \expandafter\global\expandafter\pdfxsafeforxmp@toks
1114 \expandafter{\the\pdfxsafeforxmp@toks#1}%
1115 \endgroup
1116 }
1117
1118 %%-----
1119 %% Markup bindings to be used during PDF string generation.
1120
1121 \def\pdfx@pdfmarkup{%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1122 \pdfx@actives
1123 \edef%\expandafter@gobble\string\}%
1124 \edef\{\expandafter@gobble\string\}%
1125 \edef\}\expandafter@gobble\string\}%
1126 \edef\pdfx@backslash\expandafter@gobble\string\\}%
1127 \def\backslash{\pdfx@backslash000\pdfx@backslash134}%
1128 \edef\pdfx@amp\expandafter@gobble\string\&%
1129 \edef\pdfx@lt\expandafter@gobble\string\<%
1130 \edef\pdfx@gt\expandafter@gobble\string\>%
1131 \let\TextCopyright\copyright % for backward compatibility
1132 \def\sep{; }%
1133 %\let\sep\pdfx@sep
1134 %% Note: '\ ', \&, \copyright are already predefined by hyperref.
1135 %% allow LICRs to expand into PDF strings
1136 \def\cf@encoding{PU}%
1137 \def\9##1{\ifcase##1\string\0\or\string\1\or\string\2\or\string\3\fi}%
1138 \def\8{\string\00}%
1139 \def\0{\string\0}\def\1{\string\1}\def\2{\string\2}\def\3{\string\3}%
1140 \pdfx@xmpunimarkup
1141 \the\pdfxsafeforxmp@toks
1142 }
1143
1144 %%-----
1145 %% Defaults
1146 \ifxetex
1147 \def\xmp@Producer{XeTeX}
1148 \else\ifluatex
1149 \def\xmp@Producer{LuaTeX}
1150 \else
1151 \def\xmp@Producer{pdfTeX}
1152 \fi\fi
1153 \global\let\pdfxProducer\xmp@Producer
1154
1155 \global\let\xmp@CreatorTool\@empty
1156 \global\let\xmp@Title\@empty
1157 \global\let\xmp@Author\@empty
1158 \global\let\xmp@Keywords\@empty
1159 \global\let\xmp@Subject\@empty
1160 \global\let\xmp@Language\@empty
1161 \global\let\xmp@Volume\@empty
1162 \global\let\xmp@Issue\@empty
1163 \global\let\xmp@CoverDisplayDate\@empty
1164 \global\let\xmp@CoverDate\@empty
1165 \global\let\xmp@Copyright\@empty
1166 \global\let\xmp@Copyrighted\@empty
1167 \global\let\xmp@CopyrightURL\@empty
1168 \gdef\xmp@WebStatement{\xmp@CopyrightURL}
1169 \global\let\xmp@Doi\@empty
1170 \global\let\xmp@ISBN\@empty
1171 \global\let\xmp@URL\@empty
1172 \global\let\xmp@Lastpage\@empty
1173 \global\let\xmp@Firstpage\@empty
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1174 \global\let\xmp@PublicationType\@empty
1175 \global\let\xmp@Journaltitle\@empty
1176 \global\let\xmp@Journalnumber\@empty
1177 %%\global\let\xmp@Type\@empty
1178 \global\let\xmp@Contributor\@empty
1179 \global\let\xmp@Coverage\@empty
1180 \global\let\xmp@Date\@empty
1181 \global\let\xmp@Relation\@empty
1182 \global\let\xmp@Source\@empty
1183 \global\let\xmp@Publisher\@empty
1184 \gdef\xmp@Org{\xmp@Publisher}
1185 \global\let\xmp@AuthoritativeDomain\@empty
1186 \global\let\xmp@Advisory\@empty
1187 \global\let\xmp@BaseURL\@empty
1188 \global\let\xmp@Identifier\@empty
1189 \global\let\xmp@Nickname\@empty
1190 \global\let\xmp@Thumbnails\@empty
1191 \global\let\xmp@Owner\@empty
1192 \global\let\xmp@CertificateURL\@empty
1193
1194 %%-----
1195 %% Alternative way to get the CreationDate using Lua for XeTeX
1196 \ifdefined\pdfcreationdate\else
1197 \begingroup %% ensure correct catcodes, not done by \dospecials
1198 \catcode'\:=12 \catcode'\.=12
1199 \begin{filecontents*}{creationdate.lua}
1200 os.remove("creationdate.timestamp")
1201 io.output("creationdate.timestamp"):write(os.date("\edef\tempa{\string D:%Y%m%d%H%M%S}\n\n"))
1202 \end{filecontents*}
1203 \endgroup
1204 \ifnum\shellescape=1
1205 \begingroup %% ensure correct catcodes when file is read in
1206 \catcode'\=12 \catcode'\.=12 \catcode'\:=12 \catcode'\+=12
1207 \immediate\write18{texlua creationdate.lua}
1208 \input{creationdate.timestamp}
1209 \def\tempc#1#2#3#4#5{#1#2#3'#4#5'}
1210 \edef\tempb{\expandafter\tempc\tempb}
1211 \edef\x{\endgroup\def\noexpand\pdfcreationdate{\tempa\tempb}}\x
1212 \else
1213 \begingroup %% ensure correct catcodes in the error/warning messages
1214 \catcode'\<=12 \catcode'\>=12 \catcode'\=12 \catcode'\-=12
1215 \catcode'\: 12 \catcode'\' 12 \catcode'\= 12
1216 \ifpdfx@noerr
1217 \PackageWarning{pdfx}{%
1218 CreationDate is not properly supported;^^J
1219 PDF validation may fail. To avoid this problem use:^^J
1220 xelatex -shell-escape -output-driver="xdvipdfmx -z 0" <filename>^^J}
1221 \else
1222 \PackageError{pdfx}{%
1223 CreationDate is not properly supported;^^J
1224 PDF validation may fail.}{To avoid this problem use:^^J
1225 xelatex -shell-escape -output-driver="xdvipdfmx -z 0" <filename> }
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1226 \fi
1227 %% Using a constant date, to allow processing to finish smoothly.
1228 \edef\x{\endgroup
1229   \def\noexpand\pdfcreationdate{\string D:20181028075445+10'00'}}%
1230   \x
1231 \fi
1232 \fi
1233
1234 %%-----
1235 \def\pdfx@findUUID#1{\edef\pdfx@tmpstring{\pdfx@mdfivesum{#1}}
1236   \expandafter\pdfx@eightofnine\pdfx@tmpstring\end}
1237 \def\pdfx@eightofnine#1#2#3#4#5#6#7#8#9\end{%
1238   \xdef\pdfx@eightchars{#1#2#3#4#5#6#7#8}
1239   \pdfx@fourofffive#9\end}
1240 \def\pdfx@fourofffive#1#2#3#4#5\end{\xdef\pdfx@ffourchars{#1#2#3#4}
1241   \pdfx@sfourofffive#5\end}
1242 \def\pdfx@sfourofffive#1#2#3#4#5\end{\xdef\pdfx@sfourchars{#1#2#3#4}
1243   \pdfx@tfourofffive#5\end}
1244 \def\pdfx@tfourofffive#1#2#3#4#5\end{\xdef\pdfx@tfourchars{#1#2#3#4}
1245   \xdef\pdfx@laststring{#5}}
1246
1247 \def\pdfx@uuid{\pdfx@eightchars-%
1248   \pdfx@ffourchars-%
1249   \pdfx@sfourchars-%
1250   \pdfx@tfourchars-%
1251   \pdfx@laststring}
1252
1253 \expandafter\ifx\csname pdfx@mdfivesum\endcsname\relax
1254   \PackageError{pdfx}{%
1255     No implementation for \string\pdfx@mdfivesum.^.^J
1256     \ifxetex XeTeX needs to be 2015 or later\fi
1257   }{%
1258     Continue without, but the PDF will not validate.
1259   }%
1260 \def\xmp@docid{}%
1261 \def\pdfx@findUUID#1{}%
1262 \def\pdfx@uuid{}%
1263 \else
1264   \pdfx@findUUID{\jobname.pdf}
1265   \def\xmp@docid{\pdfx@uuid}
1266 \fi
1267
1268 \expandafter\ifx\csname pdfcreationdate\endcsname\relax\relax
1269   \PackageWarning{pdfx}{%
1270     No implementation for \string\pdfxcreation .
1271   }%
1272 \def\xmp@instid{}%
1273 %%
1274 \else %% use the MD5 sum methods
1275 %%
1276   \pdfx@findUUID{\pdfcreationdate}%
1277   \def\xmp@instid{\pdfx@uuid}
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1278 \fi
1279
1280 %%-----
1281 %% load xcolor before hyperref to get the link colors correct
1282 %%
1283 \PassOptionsToPackage{nosetpagesize}{color}
1284 \PassOptionsToPackage{nosetpagesize}{graphics}
1285 \ifpackageloaded{xcolor}{%
1286 % Beamer will have already loaded xcolor
1287 % need to understand what options it used
1288 }{
1289 \ifpdfx@x
1290 \RequirePackage[cmyk,hyperref]{xcolor}
1291 \else
1292 \RequirePackage[rgb,hyperref]{xcolor}
1293 \fi
1294 }%
1295
1296 %% loading puenc.def will kill a lot of what mathtext.sty established
1297 \ifpackageloaded{mathtext}{%
1298 \PackageWarningNoLine{pdfx}{pdfx.sty and hyperref.sty should be loaded^^J
1299 before mathtext.sty , otherwise text symbols may not show in math mode.}%
1300 }{}
1301
1302 \newif\ifpdfx@hluatex
1303 \IfFileExists{hluatex.def}{\pdfx@hluatextrue}{\pdfx@hluatexfalse}
1304
1305 %% the "pdftex" option seems to work fine with LuaTeX
1306 \def\pdfx@luatetest{\ifpdfx@hluatex luatex\else pdftex \fi}
1307
1308 %% Hyperref options for PDF/X
1309 \edef\pdfx@pdfX@opts@pdftex{%
1310 draft,pdftex,pdfpagemode=UseNone,bookmarks=false,%
1311 pdfversion=1.\thepdfminorversion,pdfstartview=}
1312 \edef\pdfx@pdfX@opts@xetex{%
1313 draft,xetex,pdfpagemode=UseNone,bookmarks=false,%
1314 pdfversion=1.\thepdfminorversion,pdfstartview=}
1315 \edef\pdfx@pdfX@opts@luatex{%
1316 draft,\pdfx@luatetest,pdfpagemode=UseNone,bookmarks=false,%
1317 pdfversion=1.\thepdfminorversion,pdfstartview=}%
1318
1319 \newif\ifpdfx@hyperrefloaded
1320 \expandafter\ifx\csname ifHy@pdfa\endcsname\relax\else\pdfx@hyperrefloadedtrue\fi
1321
1322 %% Hyperref options for PDF/A and PDF/E
1323 \newtoks\pdfx@tmptoks
1324 \pdfx@tmptoks{%
1325 \ifHy@pdfa
1326 \edef\pdfx@pdfAE@opts@pdftex{pdftex}%
1327 \edef\pdfx@pdfAE@opts@xetex{xetex,pdfversion=1.\thepdfminorversion}%
1328 \edef\pdfx@pdfAE@opts@luatex{\pdfx@luatetest,pdfversion=1.\thepdfminorversion}%
1329 \edef\pdfx@pdfAE@opts@pdfmark{pdfmark,pdfversion=1.\thepdfminorversion}%

```



# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1330 \else
1331   \edef\pdfx@pdfAE@opts@pdftex{pdftex,pdfa}%
1332   \edef\pdfx@pdfAE@opts@xetex{xetex,pdfa,pdfversion=1.\thepdfminorversion}%
1333   \edef\pdfx@pdfAE@opts@luatex{\pdfx@luatex,pdfa,pdfversion=1.\thepdfminorversion}%
1334   \edef\pdfx@pdfAE@opts@pdfmark{pdfmark,pdfa,pdfversion=1.\thepdfminorversion}%
1335 \fi
1336 }
1337 \ifpdfx@hyperrefloaded
1338 \the\pdfx@tmp toks\relax
1339 \else
1340   \edef\pdfx@pdfAE@opts@pdftex{pdftex,pdfa}%
1341   \edef\pdfx@pdfAE@opts@xetex{xetex,pdfa,pdfversion=1.\thepdfminorversion}%
1342   \edef\pdfx@pdfAE@opts@luatex{\pdfx@luatex,pdfa,pdfversion=1.\thepdfminorversion}%
1343   \edef\pdfx@pdfAE@opts@pdfmark{pdfmark,pdfa,pdfversion=1.\thepdfminorversion}%
1344 \fi
1345 \pdfx@tmp toks{}%
1346
1347 \ifpdfx@x
1348 \@ifpackageloaded{hyperref}{%
1349   \ifxetex
1350     \expandafter\hypersetup\expandafter{\pdfx@pdfX@opts@xetex}
1351   \else\ifluatex
1352     \expandafter\hypersetup\expandafter{\pdfx@pdfX@opts@luatex}
1353   \else
1354     \expandafter\hypersetup\expandafter{\pdfx@pdfX@opts@pdftex}
1355   \fi\fi
1356 }{%
1357   \ifxetex
1358     \expandafter\RequirePackage\expandafter[\pdfx@pdfX@opts@xetex]{hyperref}
1359   \else\ifluatex
1360     \expandafter\RequirePackage\expandafter[\pdfx@pdfX@opts@luatex]{hyperref}
1361   \else
1362     \expandafter\RequirePackage\expandafter[\pdfx@pdfX@opts@pdftex]{hyperref}
1363   \fi\fi
1364 }%
1365 \else
1366 \ifpdfx@e
1367 \@ifpackageloaded{hyperref}{%
1368   \ifxetex
1369     \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@xetex}
1370   \else\ifluatex
1371     \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@luatex}
1372   \else
1373     \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@pdftex}
1374   \fi\fi
1375 }{%
1376   \ifxetex
1377     \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@xetex]{hyperref}
1378   \else\ifluatex
1379     \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@luatex]{hyperref}
1380   \else
1381     \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@pdftex]{hyperref}
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1382 \fi\fi
1383 }%
1384 \else % generating PDF/A or ...
1385 \ifpackageloaded{hyperref}{%
1386 \ifxetex
1387 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@xetex}%
1388 \else\ifluatex
1389 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@luatex}%
1390 \else
1391 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@pdftex}%
1392 \fi\fi
1393 }{%
1394 \ifxetex
1395 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@xetex]{hyperref}
1396 \else\ifluatex
1397 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@luatex]{hyperref}
1398 \else
1399 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@pdftex]{hyperref}
1400 \fi\fi
1401 }%
1402 \fi\fi
1403 \hypersetup{pdfencoding=auto}% unicode
1404 \expandafter\ifx\csname KV@Hyp@psdextra\endcsname\relax\else
1405 \hypersetup{psdextra}
1406 \fi
1407
1408 %% hyperref doesn't set the minor version for XeTeX
1409 \ifxetex
1410 \special{pdf:minorversion \thepdfminorversion}
1411 \fi
1412
1413 \ifx\xmp@CreatorTool\empty
1414 \edef\xmp@CreatorTool{\@pdfcreator}
1415 \fi
1416
1417 \newif\ifpdfx@cmymk
1418 \newif\ifpdfx@custom
1419 \ifpdfx@x % PDF/X normally needs a CMYK color profile for printing
1420 \global\pdfx@cmymktrue
1421 \fi
1422 %%-----
1423 %% ----- Color Profiles -----
1424 %% Define how to specify the profile, so the default
1425 %% can be over-ridden in the .xmldata file.
1426 %%
1427 %% --- user-command --- RGB profile needed with PDF/A-??
1428 %% \setRGBcolorprofile{<filename>}{<identifier>}
1429 %% {<info string>}{<registry URL>}
1430 \def\setRGBcolorprofile{%
1431 \begingroup
1432 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1433 \catcode'\% 11\relax
```

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```
1434 \edef\{\string\{}\edef\{\string\})%
1435 \pdfx@setrgbprofile}
1436 %%
1437 %% --- user-command --- CMYK profile needed with PDF/X-??
1438 %% \setCMYKcolorprofile{<filename>}{<output intent>}
1439 %% {<identifier>}{<registry URL>}
1440 \def\setCMYKcolorprofile{%
1441 \begingroup
1442 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1443 \catcode'\% 11\relax
1444 \edef\{\string\{}\edef\{\string\})%
1445 \pdfx@setcmykprofile}
1446 %%
1447 %% --- user-command --- DeviceGray profile needed with PDF/E-1
1448 %% \setGRAYcolorprofile{<filename>}{<output intent>}
1449 %% {<identifier>}{<registry URL>}
1450 \def\setGRAYcolorprofile{%
1451 \begingroup
1452 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1453 \catcode'\% 11\relax
1454 \edef\{\string\{}\edef\{\string\})%
1455 \pdfx@setgrayprofile}
1456 %%
1457 %% --- user-command --- External profile with PDF/X-4p and PDF/X-5pg
1458 %% \setEXTERNALprofile{<profilename>}{<output intent>}
1459 %% {<identifier>}{<registry URL>}{<color-space>}%
1460 %% {<ICC Version>}{<provider URL>}{<extra info>}{<Check Sum>}
1461 \def\setEXTERNALprofile{%
1462 \begingroup
1463 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1464 \catcode'\% 11\relax
1465 \edef\{\string\{}\edef\{\string\})%
1466 \ifnoiccprofile
1467 \expandafter\pdfx@externalprofile
1468 \else
1469 \expandafter\pdfx@externalprofile@gobble
1470 \fi
1471 }
1472 %%
1473 %%
1474 \def\pdfx@setRGBcolorprofiledir#1{%
1475 \xdef\pdfx@RGBcolorprofiledir{#1}%
1476 }
1477 \def\pdfx@setCMYKcolorprofiledir#1{%
1478 \xdef\pdfx@CMYKcolorprofiledir{#1}%
1479 }
1480 \pdfx@setRGBcolorprofiledir{}
1481 \pdfx@setCMYKcolorprofiledir{}
1482
1483 %% This does indeed work! Use it in .xmpdata files
1484 \providecommand{\MacOSColordir}{/System/Library/ColorSync/Profiles/}
1485 \providecommand{\MacOSLibraryColordir}{/Library/ColorSync/Profiles/}
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
1486 \providecommand{\AdobeMacOSdir}%
1487 {/Library/Application Support/Adobe/Color/Profiles/Recommended/}
1488 \edef\pdfx@tmp{C:\string\Windows\string\System32\string\Spool%
1489 \string\Drivers\string\Color\string/}
1490 \expandafter\providecommand\expandafter
1491 {\expandafter\WindowsColordir\expandafter}\expandafter{\pdfx@tmp}
1492 %%\pdfx@setcolorprofiledir{\AdobeMacOSdir}
1493
1494 %% override that value using the following commands:
1495 \let\pdfxSetCMYKcolorProfileDir\pdfx@setCMYKcolorprofiledir
1496 \let\pdfxSetRGBcolorProfileDir\pdfx@setRGBcolorprofiledir
1497 %% for back-compatibility
1498 \let\pdfxSetColorProfileDir\pdfxSetCMYKcolorProfileDir
1499 %%
1500 \def\pdfx@setrgbpfile#1#2#3#4{%
1501 \xdef\pdfx@rgb@profile{\pdfx@RGBcolorprofiledir#1}% valid file path/name
1502 \xdef\pdfx@rgb@profilename{#1}% valid file name
1503 \gdef\pdfx@rgb@identifier{#2}%
1504 \gdef\pdfx@rgb@info{#3}%
1505 \pdfstringdef\pdfx@rgb@registry{#4}% valid URL
1506 \endgroup
1507 \global\pdfx@cmykfalse
1508 }% closes-off \setRGBcolorprofile
1509 %%
1510 \def\pdfx@setcmypfile#1#2#3#4{%
1511 \xdef\pdfx@cmk@profile{\pdfx@CMYKcolorprofiledir#1}% valid file path/name
1512 \xdef\pdfx@cmk@profilename{#1}% valid file name
1513 %% \expandafter\gdef\expandafter\pdfx@cmk@profile\expandafter
1514 %% {\pdfx@colorprofiledir#1}% valid file name
1515 \gdef\pdfx@cmk@intent{#2}%
1516 %% \pdfstringdef\pdfx@cmk@intent{#2}% color intent
1517 \gdef\pdfx@cmk@identifier{#3}%
1518 %% \pdfstringdef\pdfx@cmk@identifier{#3}% text string identifier
1519 \gdef\pdfx@cmk@registry{#4}%
1520 %% \pdfstringdef\pdfx@cmk@registry{#4}% valid URL
1521 \endgroup
1522 \global\pdfx@cmyktrue
1523 }% closes-off \setcmkcolorprofile
1524 %%
1525 \def\setCUSTOMcolorprofile{%
1526 \begingroup
1527 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1528 \catcode'\% 11\relax
1529 \edef\({\string\}\edef\){\string\})%
1530 \pdfx@setcustomprofile
1531 }
1532 \def\pdfx@setcustomprofile#1#2#3#4#5#6#7#8{%
1533 \xdef\pdfx@customcolorprofiledir{#2}% valid directory location
1534 \xdef\pdfx@custom@profile{#1}% valid file name
1535 \gdef\pdfx@custom@identifier{#3}%
1536 \gdef\pdfx@custom@registry{#4}%
1537 \gdef\pdfx@custom@numcolors{#5}% num-colors specifier
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1538 \gdef\pdfx@iccversion{#6}% Hex string for /ICCVersion < ... >
1539 \gdef\pdfx@custom@colornames{#7}%
1540 \gdef\pdfx@profile@checksum{#8}% Hex string for /Checksum < ... >
1541 \endgroup
1542 \global\pdfx@cmkyfalse
1543 \global\pdfx@customtrue
1544 }% closes-off \pdfx@setcustomprofile
1545 %%
1546 \def\pdfx@setgrayprofile#1#2#3#4{%
1547 \gdef\pdfx@gray@profile{#1}% valid file name
1548 \gdef\pdfx@gray@intent{#2}%
1549 \gdef\pdfx@gray@identifier{#3}%
1550 \pdfstringdef\pdfx@gray@registry{#4}% valid URL
1551 \endgroup}% closes-off \setGRAYcolorprofile
1552 %%
1553 \def\pdfx@externalprofile#1#2#3#4#5#6#7#8#9{%
1554 \gdef\pdfx@extprofile{#1}% PDF string for /ProfileName
1555 \gdef\pdfx@cmky@intent{#2}% PDF string for /OutputCondition
1556 \gdef\pdfx@cmky@identifier{#3}% PDF string for /OutputConditionIdentifier
1557 \gdef\pdfx@cmky@registry{#4}% {http://www.color.org}%
1558 \gdef\pdfx@profileCS{#5}% 4 bytes for /ProfileCS
1559 \gdef\pdfx@iccversion{#6}% Hex string for /ICCVersion < ... >
1560 \gdef\pdfx@colorURL{#7}% URL
1561 \gdef\pdfx@cmky@info{#8}% for /Info
1562 \gdef\pdfx@profile@checksum{#9}% Hex string for /Checksum < ... >
1563 \endgroup}% closes-off \setEXTERNALprofile
1564 \def\pdfx@externalprofile@gobble#1#2#3#4#5#6#7#8#9{%
1565 \PackageError{pdfx}{Wrong option for using an External Color profile}%
1566 {Use one of the options: x-4p , x-4p08 , x-4p10 or x-5pg .}%
1567 \endgroup}
1568 %%
1569 %% default color profiles
1570
1571 {\catcode'\_ 12 \catcode'\& 12 \catcode'\~ 12
1572 \gdef\pdfx@xprofile@cmkydefault{coated_FOGRA39L_arg1.icc}
1573 \gdef\pdfx@aprofile@rgbdefault{sRGB_IEC61966-2-1_black_scaled.icc}
1574 \gdef\pdfx@eprofile@graydefault{Gray_linear.icc}
1575 \gdef\pdfx@pprofile@externaldefault{FOGRA39}
1576 }% end of \catcode
1577 \xdef\pdfx@rgb@profile{\pdfx@aprofile@rgbdefault}
1578 \xdef\pdfx@cmky@profile{\pdfx@xprofile@cmkydefault}
1579 \xdef\pdfx@gray@profile{\pdfx@eprofile@graydefault}
1580 \xdef\pdfx@external@profile{\pdfx@pprofile@externaldefault}
1581
1582 %%-----
1583 %% License for the file sRGB_IEC61966-2-1_black_scaled.icc :
1584 %%
1585 %% Copyright International Color Consortium, 2009 -- http://www.color.org/
1586 %%
1587 %% It is hereby acknowledged that the file "sRGB_IEC61966-2-1_black_scaled.icc"
1588 %% is provided "AS IS" WITH NO EXPRESS OR IMPLIED WARRANTY.
1589 %%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1590 %% Licensing
1591 %%
1592 %% This profile is made available by the International Color Consortium,
1593 %% and may be copied, distributed, embedded, made, used, and sold without
1594 %% restriction. Altered versions of this profile shall have the original
1595 %% identification and copyright information removed and shall not be
1596 %% misrepresented as the original profile.
1597 %%
1598 %% Terms of use
1599 %%
1600 %% To anyone who acknowledges that the file "sRGB_IEC61966-2-1_black_scaled.icc"
1601 %% is provided "AS IS" WITH NO EXPRESS OR IMPLIED WARRANTY, permission to use,
1602 %% copy and distribute these file for any purpose is hereby granted without fee,
1603 %% provided that the file is not changed including the ICC copyright notice tag,
1604 %% and that the name of ICC shall not be used in advertising or publicity
1605 %% pertaining to distribution of the software without specific, written prior
1606 %% permission. ICC makes no representations about the suitability of this
1607 %% software for any purpose.
1608 %%
1609 %%-----
1610
1611 \newif\ifpdfx@tryoldprofiles
1612
1613 %% The colorprofiles package was added to TeXLive in October 2018.
1614 %% It allows the default Color Profiles to be maintained independent
1615 %% of the pdfx package.
1616 %% In particular sRGB_IEC61966-2-1_black_scaled.icc is no longer
1617 %% distributed with TeXLive 2018 and later.
1618 %% Older versions still have this file.
1619 %%
1620 \IfFileExists{colorprofiles.tex}{%
1621   \RequirePackage{colorprofiles}[2018/11/01]%
1622   \ifx\colorpro@rgb@profile\relax
1623     \expandafter\pdfx@tryoldprofilestrue
1624   \else
1625     \begingroup %% \endgroup occurs within the macro expansion
1626     \pdfx@setrgbprofile{\colorpro@rgb@profile
1627       }\colorpro@rgb@identifier
1628       }\colorpro@rgb@info
1629       }\colorpro@rgb@registry
1630     }%
1631     \begingroup %% \endgroup occurs within the macro expansion
1632     \pdfx@setcmykprofile{\colorpro@cmyk@profile
1633       }\colorpro@cmyk@intent
1634       }\colorpro@cmyk@identifier
1635       }\colorpro@cmyk@registry
1636     }%
1637     \expandafter\pdfx@tryoldprofilesfalse
1638   \fi
1639 }{\pdfx@tryoldprofilestrue}
1640
1641 {\catcode'\| 14 \catcode'\% 12 \catcode'\_ 12 \catcode'\: 12
```



# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1642 \catcode'\. 12 \catcode'\- 12 \catcode'\ / 12
1643 \edef\@bchar{\expandafter\@gobble\string\\}|
1644 \edef\({\string\}\edef\){\string\\}|
1645 \ifpdfx@tryoldprofiles
1646 || this will be used by TeXLive installations up to 2017.
1647 \begingroup | \endgroup occurs within the macro expansion
1648 \expandafter\pdfx@setrgbprofile\expandafter
1649 {sRGB_IEC61966-2-1_black_scaled.icc}|
1650 {sRGB_IEC61966-2-1_black_scaled}|
1651 {sRGB IEC61966 v2.1 with black scaling}|
1652 {http://www.color.org}|
1653 \begingroup | \endgroup occurs within the macro expansion
1654 \pdfx@setcmypkprofile{coated_FOGRA39L_arg1.icc}| coated_FOGRA39L_arg1.icc
1655 {Coated FOGRA39}|
1656 {FOGRA39 \string\ (ISO Coated v2 300%\space \string\ (ECI\string\)\string\\)}|
1657 {http://www.argyllcms.com/}|{http://www.color.org}|
1658 \fi || end of \ifpdfx@tryoldprofiles
1659 \begingroup | \endgroup occurs within the macro expansion
1660 \pdfx@setgrayprofile{Gray_linear.icc}|
1661 {}|
1662 {Custom}|
1663 {http://www.freedesktop.org/wiki/OpenIcc}|
1664 \ifno@iccprofile
1665 \begingroup | \endgroup occurs within the macro expansion
1666 \pdfx@externalprofile{Coated FOGRA39 \ (ISO 12647-2:2004\\)}|
1667 {Offset commercial and specialty printing according to ISO 12647-2:2004 |
1668 / Amd 1, paper type 1 or 2 \ (gloss or matte coated offset, 115 g/m2\\), |
1669 screen frequency 60/cm.}|
1670 {FOGRA39}{http://www.color.org}{CMYK}{02100000}{http://www.adobe.com}|
1671 {Coated FOGRA39 \ (ISO 12647-2:2004\\)}{74FF62F330BF0DBE4495B5720542D511}|
1672 \fi
1673 }% end of \catcode
1674
1675 %%
1676 %%-----
1677 %% License for the file coated_FOGRA39L_arg1.icc :
1678 %%
1679 %% The zlib/libpng License
1680 %%
1681 %% Copyright (c) 2008 Kai-Uwe Behrmann
1682 %%
1683 %% This software is provided 'as-is', without any express or implied
1684 %% warranty. In no event will the authors be held liable for any damages
1685 %% arising from the use of this software.
1686 %%
1687 %% Permission is granted to anyone to use this software for any purpose,
1688 %% including commercial applications, and to alter it and redistribute
1689 %% it freely, subject to the following restrictions:
1690 %%
1691 %% 1. The origin of this software must not be misrepresented; you
1692 %% must not claim that you wrote the original software. If you use
1693 %% this software in a product, an acknowledgment in the product
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1694 %%      documentation would be appreciated but is not required.
1695 %%
1696 %%      2. Altered source versions must be plainly marked as such, and
1697 %%      must not be misrepresented as being the original software.
1698 %%
1699 %%      3. This notice may not be removed or altered from any source
1700 %%      distribution.
1701 %%-----
1702
1703 \newif\ifexternalICCprofiles
1704 \newif\ifpdfx@noXMPdata
1705
1706 \begingroup
1707 %% override unneeded color-profile specifier
1708 \ifpdfx@x
1709   \ifno@iccprofile % PDF/X-4p and PDF/X-5pg PDF/VT-2
1710     \begingroup
1711       \def\pdfx@extprofiles@store{AdobeExternalProfiles.tex}%
1712       \InputIfFileExists{\pdfx@extprofiles@store}%
1713       {\global\externalICCprofiletrue \catcode '\# 12\relax}%
1714       {\typeout{** pdfx: No file \pdfx@extprofiles@store\space
1715         found for PDF/X-4p or PDF/X-5pg}}%
1716     \endgroup
1717   \else
1718     \begingroup
1719       \def\pdfx@profiles@store{AdobeColorProfiles.tex}%
1720       \InputIfFileExists{\pdfx@profiles@store}%
1721       {\global\externalICCprofilesfalse \catcode '\# 12\relax}%
1722       {\typeout{** pdfx: No file \pdfx@profiles@store\space
1723         found for PDF/X variants}}%
1724     \endgroup
1725   %% \def\setRGBcolorprofile#1#2#3#4{%
1726   %% \PackageError{pdfx}{PDF/X requires a CMYK color profile}%
1727   %% {Just continue using the default CMYK profile.^^J}%
1728   \fi
1729   \else
1730   %% load it, in case the macros are used in .xmpdata
1731   \InputIfFileExists{AdobeColorProfiles.tex}{}{}%
1732   \ifpdfx@e
1733   \else
1734     \def\setCMYKcolorprofile#1#2#3#4{%
1735     \def\setGRAYcolorprofile#1#2#3#4{%
1736   \fi\fi
1737   %%
1738   \ifluatex\else\ifxetex\else
1739     \inputencodings{8bit}%
1740   \fi\fi
1741   \makeatletter
1742   \pdfx@localcommands
1743   %% Do this in a box, so any stray characters don't get into TeX's lists.
1744   \setbox0\hbox{%
1745     \InputIfFileExists{\jobname.xmpdata}%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1746 {\typeout{** pdfx: Metadata file \jobname.xmpdata read successfully.}}%
1747 {\typeout{** pdfx: No file \jobname.xmpdata .
1748   Metadata will be incomplete!}\aftergroup\pdfx@noXMPdatatrue}}
1749 \endgroup
1750 %% -----
1751
1752 \def\pdfx@LanguageSpec{}
1753 \def\pdfx@mainLanguage{en-US}% absolute default
1754 \def\pdfx@checkfor@sep#1#2\sep#3\pdfx@endparse{\def#1{#2}}
1755 \ifx\relax \xmp@Language\else
1756   \expandafter\pdfx@checkfor@sep\expandafter\pdfx@mainLanguage\xmp@Language
1757   \sep\pdfx@endparse
1758 \fi
1759 \edef\pdfx@LanguageSpec{/Lang (\pdfx@mainLanguage)}
1760
1761 %% -----
1762 \begingroup
1763 \catcode'\_ 12 \catcode'\` 12 \catcode'\` 12
1764 \catcode'\< 12 \catcode'\> 12 \catcode'\ / 12 \catcode'\[ 12 \catcode'\] 12
1765 \edef\@pctchar{\expandafter\@gobble\string\}%
1766 \edef\@bchar{\expandafter\@gobble\string\}%
1767 \edef\@0{\string\0}
1768 \edef\@{\string\{ }
1769 \edef\@}\{\string\} }
1770 %%
1771 \def\pdfx@outcatalog@dict{%
1772   \pdfx@LanguageSpec
1773   /ViewerPreferences <</DisplayDocTitle true >>
1774   /OutputIntents \pdfx@outintents % needs appropriate expansion
1775 }%
1776 \ifpdfx@x % PDF/X needs a CMYK or RGB color profile for printing
1777 \ifno@iccprofile % PDF/X-4p and PDF/X-5pg
1778 %%
1779 %% URL and metadata for the desired external Color Profile
1780 %%
1781 \edef\pdfx@colorURL@dict{<</FS/URL/F(\pdfx@colorURL)>>}
1782 \def\pdfx@colorprofile@dict{<< %
1783   /Checksum <\pdfx@profile@checksum>^^J%
1784   /ICCVersion <\pdfx@iccversion>%
1785   /ProfileCS (\pdfx@profileCS)^^J%
1786   /ProfileName (\pdfx@extprofile)^^J%
1787   /URLs [\OBJ@URLs] >>
1788 }
1789 %% How to specify the PDF objects with different drivers
1790 \ifxetex
1791   \def\OBJ@URLs{ @colorURL }%
1792   \def\OBJ@ICC{ @colorprofile }%
1793   \immediate\special{pdf:obj \OBJ@URLs \pdfx@colorURL@dict }%
1794   \immediate\special{pdf:obj \OBJ@ICC \pdfx@colorprofile@dict }%
1795 \else % pdfTeX & LuaTeX
1796   \immediate\pdfobj{\pdfx@colorURL@dict}%
1797   \edef\OBJ@URLs{\the\pdflastobj\space 0 R}%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1798 \immediate\pdfobj{\pdfx@colorprofile@dict}%
1799 \edef\OBJ@ICC{\the\pdflastobj\space 0 R}%
1800 \fi
1801 %% Output Intent dictionary, with object reference
1802 \edef\pdfx@outintent@dict{%
1803 /Type/OutputIntent
1804 /S/GTS_PDFX^^J
1805 /OutputCondition (\pdfx@cmyk@intent)^^J
1806 /OutputConditionIdentifier (\pdfx@cmyk@identifier)^^J
1807 /Info(\pdfx@cmyk@intent)^^J
1808 /RegistryName(\pdfx@cmyk@registry)^^J
1809 %% extra dictionary required for PDF/X-4p and PDF/X-5pg
1810 /DestOutputProfileRef \OBJ@ICC
1811 }%
1812 %%
1813 \else % PDF/X-1 , PDF/X-1a , PDF/X-3 , PDF/X-4 , PDF/X-5g
1814 %%
1815 \ifpdfx@cmyk
1816 \IfFileExists{"\pdfx@cmyk@profile"}{%
1817 % embedded CMYK color profile
1818 %%
1819 %% Output Intent dictionary, with object reference
1820 \def\pdfx@outintent@dict{%
1821 /Type/OutputIntent
1822 /S/GTS_PDFX^^J
1823 /OutputCondition (\pdfx@cmyk@intent)^^J
1824 /OutputConditionIdentifier (\pdfx@cmyk@identifier)^^J
1825 /Info(\pdfx@cmyk@intent)^^J
1826 /RegistryName(\pdfx@cmyk@registry)
1827 /DestOutputProfile \OBJ@CMYK
1828 }%
1829 \def\pdfx@numcoords{/N 4}%
1830 %%
1831 \ifxetex
1832 \def\OBJ@CMYK{@colorprofile}%
1833 \immediate\special{%
1834 pdf:fstream \OBJ@CMYK (\pdfx@cmyk@profile) <<\pdfx@numcoords >>%
1835 \else % pdfTeX
1836 \immediate\pdfobj stream attr{\pdfx@numcoords} file {\pdfx@cmyk@profile}%
1837 \edef\OBJ@CMYK{\the\pdflastobj\space 0 R}%
1838 \fi
1839 \pdfcatalog{%
1840 \pdfx@LanguageSpec
1841 /OutputIntents [ <<
1842 /Type/OutputIntent
1843 /S/GTS_PDFX
1844 /OutputCondition (\pdfx@cmyk@intent)%
1845 /OutputConditionIdentifier (\pdfx@cmyk@identifier)%
1846 /Info(\pdfx@cmyk@intent)%
1847 /RegistryName(\pdfx@cmyk@registry)
1848 /DestOutputProfile \OBJ@CMYK
1849 >> ]}%

```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
1850 }{%
1851   \PackageError{pdfx}{No color profile \pdfx@cmyk@profilename\space found
1852     to use for CMYK printing colors.}%
1853   {Is this the correct directory: \pdfx@CMYKcolorprofiledir\space ?}%
1854 }% end of \IfFileExists for CMYK
1855 \else\ifpdfx@custom
1856 %% allow Custom profile with PDF/X-5n
1857 \IfFileExists{"\pdfx@customcolorprofiledir\pdfx@custom@profile"}{%
1858 %% embedded Custom color profile
1859 %%
1860 %% Output Intent dictionary, with object reference
1861 \def\pdfx@outintent@dict{%
1862   /Type/OutputIntent
1863   /S/GTS_PDFX^^J
1864   /OutputConditionIdentifier (Custom)^^J
1865   /OutputCondition (\pdfx@custom@identifier)^^J
1866   /Info(\pdfx@custom@profile)^^J
1867   /RegistryName(\pdfx@custom@registry)
1868   /Registry(\pdfx@custom@registry)
1869   /DestOutputProfileRef \OBJ@CustomDir
1870 }%
1871 \def\OBJ@CustomDir{<<
1872   \pdfx@numcoords^^J
1873   /URLs [ << /Type /Filespec ^^J/EF \OBJ@CustomFile^^J
1874     /F (\pdfx@custom@profile) /UF (\pdfx@custom@profile) >>]^^J
1875   >>}
1876 %% need more attributes:
1877 \def\pdfx@numcoords{%
1878   /Checksum <\pdfx@profile@checksum>^^J%
1879   /ICCVersion <\pdfx@iccversion>%
1880   /ProfileName (\pdfx@custom@profile)^^J%
1881   /ProfileCS (\pdfx@custom@numcolors)^^J%
1882   /ColorantTable [\pdfx@custom@colornames]
1883 }%
1884 \def\pdfx@custom@filespec{%
1885   /Type /EmbeddedFile >>^^J
1886   /Subtype (application/vnd.iccprofile )
1887 }%
1888 %%
1889 \ifxetex
1890   \def\OBJ@CustomFile{@colorprofile}%
1891   \immediate\special{pdf:fstream \OBJ@CustomFile
1892     (\pdfx@customcolorprofiledir\pdfx@custom@profile) <<\pdfx@custom@filespec >>}%
1893 \else % pdfTeX
1894   \immediate\pdfobj stream attr{\pdfx@custom@filespec} file %
1895     {\pdfx@customcolorprofiledir\pdfx@custom@profile}%
1896   \edef\OBJ@CustomFile{\the\pdflastobj\space 0 R}%
1897 \fi
1898 \pdfcatalog{%
1899   \pdfx@LanguageSpec
1900   /OutputIntents [ << \pdfx@outintent@dict >>]}%
1901 }{%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
1902 \PackageError{pdfx}%
1903 {No color profile \pdfx@custom@profile\space found to use for Custom printing colors.}%
1904 {Is this the correct directory: \pdfx@customcolorprofiledir\space ?}%
1905 }% end of \IfFileExists for Custom
1906 \global\pdfx@cmyktrue % for TeX coloring
1907 %%
1908 \else % allow RGB profile with PDF/X ???
1909 \ifpdfx@noerr
1910 \PackageWarning{pdfx}{PDF/X normally requires a CMYK color profile.^J
1911 Assuming RGB profile is of type 'prtr' not 'mntr'.^J^J}%
1912 \else
1913 \PackageError{pdfx}{PDF/X normally requires a CMYK color profile.}%
1914 {To use RGB ensure profile is of type 'prtr' not 'mntr'.^J^J}%
1915 \fi
1916 % embedded RGB color profile
1917 %%
1918 %% Output Intent dictionary, with object reference
1919 \def\pdfx@outintent@dict{%
1920 /Type /OutputIntent
1921 /S/GTS_PDFX^J
1922 /OutputConditionIdentifier (\pdfx@rgb@identifier)^J
1923 /DestOutputProfile \OBJ@RGB^J
1924 /Info(\pdfx@rgb@info)^J
1925 /RegistryName(\pdfx@rgb@registry)
1926 }%
1927 \IfFileExists{"\pdfx@rgb@profile"}{%
1928 \def\pdfx@numcoords{/N 3 /Alternate/DeviceRGB}
1929 \ifxetex
1930 \immediate\special{%
1931 pdf:fstream @colorprofile (\pdfx@rgb@profile) << \pdfx@numcoords >>}
1932 \def\OBJ@RGB{@colorprofile}%
1933 \else
1934 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@rgb@profile}%
1935 \edef\OBJ@RGB{\the\pdflastobj\space 0 R}%
1936 \fi
1937 \edef\pdfx@outintent@dict{%
1938 /Type /OutputIntent
1939 /S/GTS_PDFX
1940 /OutputConditionIdentifier (\pdfx@rgb@identifier)%
1941 /DestOutputProfile \OBJ@RGB
1942 /Info(\pdfx@rgb@info)
1943 /RegistryName(\pdfx@rgb@registry)
1944 }%
1945 \ifxetex
1946 \def\OBJ@RGB{ @colorprofile }%
1947 \immediate\special{%
1948 pdf:fstream @colorprofile (\pdfx@rgb@profile) <<\pdfx@numcoords >>}
1949 \else %% pdfTeX or LuaTeX
1950 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@rgb@profile}%
1951 \edef\OBJ@RGB{\the\pdflastobj\space 0 R}%
1952 \fi
1953 }{%
```



# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1954 \PackageError{pdfx}%
1955 {No color profile \pdfx@rgb@profilename\space found to use for RGB screen colors.}%
1956 {Is this the correct directory: \pdfx@RGBcolorprofiledir\space ?}%
1957 }% end of \IfFileExists for RGB
1958 \fi % end of \ifpdfx@custom
1959 \fi % end of \ifpdfx@cmyk
1960 \fi % end of \ifno@iccprofile
1961 %% end of PDF/X
1962 \else
1963 %% PDF/A and PDF/E can specify a CMYK profile
1964 \expandafter\ifx\expandafter\relax\pdfx@rgb@profile\relax
1965 \global\pdfx@cmyktrue
1966 \IfFileExists{"\pdfx@cmyk@profile"}{%
1967 \def\pdfx@numcoords{/N 4}
1968 % embedded CMYK color profile
1969 \ifxetex
1970 \def\OBJ@CMYK{@colorprofile}%
1971 \special{pdf:fstream @colorprofile (\pdfx@cmyk@profile) <<\pdfx@numcoords >>}
1972 \else %% pdfTeX or LuaTeX
1973 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@cmyk@profile}%
1974 \edef\OBJ@CMYK{\the\pdflastobj\space 0 R}%
1975 \fi
1976 \edef\pdfx@outintent@dict{%
1977 /Type /OutputIntent
1978 \ifpdfx@e
1979 /S/ISO_PDFE1
1980 \else
1981 /S/GTS_PDFA1
1982 \fi
1983 /OutputCondition (\pdfx@cmyk@intent)% use this or /Info ?
1984 /OutputConditionIdentifier (\pdfx@cmyk@identifier)%
1985 /DestOutputProfile \OBJ@CMYK
1986 /Info(\pdfx@cmyk@intent)%
1987 /RegistryName(\pdfx@cmyk@registry)
1988 }%
1989 }{%
1990 \PackageError{pdfx}{No color profile \pdfx@cmyk@profilename\space found
1991 to use for CMYK printing colors.}%
1992 {Is this the correct directory: \pdfx@CMYKcolorprofiledir\space ?}%
1993 }% end of \IfFileExists for CMYK
1994 \else
1995 %% PDF/A and PDF/E usually need an RGB color profile for on-screen rendering
1996 \global\pdfx@cmykfalse
1997 \expandafter\IfFileExists\expandafter{\pdfx@rgb@profile}{%
1998 \def\pdfx@numcoords{/N 3 /Alternate/DeviceRGB}
1999 \ifxetex
2000 \def\OBJ@RGB{ @colorprofile }%
2001 \immediate\special{pdf:fstream @colorprofile (\pdfx@rgb@profile) <<\pdfx@numcoords >>}
2002 \else
2003 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@rgb@profile}%
2004 \edef\OBJ@RGB{\the\pdflastobj\space 0 R}%
2005 \fi
```

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```
2006 \edef\pdfx@outintent@dict{%
2007   /Type /OutputIntent
2008   \ifpdfx@e
2009     /S/ISO_PDFE1
2010   \else
2011     /S/GTS_PDFA1
2012   \fi
2013   /OutputConditionIdentifier (\pdfx@rgb@identifier)%
2014   /DestOutputProfile \OBJ@RGB
2015   /Info(\pdfx@rgb@info)
2016   /RegistryName(\pdfx@rgb@registry)
2017 }%
2018 }{%
2019   \PackageError{pdfx}%
2020   {No color profile \pdfx@rgb@profilename\space found to use for RGB screen colors.}%
2021   {Is this the correct directory: \pdfx@RGBcolorprofiledir\space ?}%
2022 }% end of \IfFileExists for RGB
2023 \fi % end of ifx for PDF/A or PDF/E
2024 \fi % end of ifpdfx@x
2025 %%
2026 \expandafter\ifx\csname pdfx@outintent@dict\endcsname\relax
2027 \else
2028 %%
2029 %% build the OutputIntent array
2030 %%
2031 \ifxetex
2032   \def\pdfx@outintents{ @outintentsarray }%
2033   \def\pdfx@outintentref{ @outintent@dict }%
2034   \immediate\special{pdf:obj \pdfx@outintentref << \pdfx@outintent@dict >>}
2035   \immediate\special{pdf:obj \pdfx@outintents [ ]}%
2036   \immediate\special{pdf:put \pdfx@outintents \pdfx@outintentref }%
2037 \else
2038   \immediate\pdfobj{<<\pdfx@outintent@dict>>}%
2039   \edef\pdfx@outintents{[\the\pdflastobj\space 0 R]}%
2040 \fi
2041 %%
2042 %% make the Catalog entry, if not already done
2043 %%
2044 \ifx\pdfx@outcatalog@dict\relax
2045 \else
2046   \pdfcatalog{\pdfx@outcatalog@dict}%
2047 \fi
2048 \fi % end of OutputIntent array and Catalog entry
2049 \endgroup
2050
2051 %% -----
2052 %% Make a version of \xmp@Keywords and \xmp@Author where \sep has been
2053 %% replaced by a comma. The first is for the pdf:Keywords property,
2054 %% which accepts a comma-separated string of keywords, and seems to be
2055 %% mandatory for PDF/A-1 compliance. The second is for the dc:creator
2056 %% property. Although it is defined to be a sequence of authors, Adobe
2057 %% Acrobat will in fact ignore and delete all except the first author.
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
2058 %% Therefore, it's safer to always separate authors by commas.
2059
2060 \begingroup
2061 \let\pdfx@xmpunimarkup\relax
2062 \pdfx@xmpmarkup
2063 \ifluatex\else\ifxetex\else
2064 \inputencoding{8bit}%
2065 \fi\fi
2066 \makeatletter
2067 \IfFileExists{\pdfx@encodingfile}{%
2068 \def\cf@encoding{L8U}\fontencoding{L8U}%
2069 }{}%
2070 \let\protect@typeset@protect
2071 \pdfx@xmpmarkup %% !!!!! no longer needed
2072 %% \xdef\xmp@@Author{\xmp@Author}% no need to expand
2073 \global\let\xmp@@Author\xmp@Author
2074 \def\sep{;}% expand to replace \sep !!! no longer needed
2075 %% \xdef\xmp@@Copyright{\xmp@Copyright}%
2076 \global\let\xmp@@Copyright\xmp@Copyright
2077 %% \xdef\xmp@@Keywords{\xmp@Keywords}%
2078 %% \global\let\xmp@@Keywords\xmp@Keywords
2079 %% \global\let\xmp@Keywords\empty %
2080 \global\let\xmp@@Keywords\empty % don't use pdf:Keywords
2081 \endgroup
2082
2083 %% -----
2084 \def\xmp@convertDate{\pdfx@getYear}
2085 {\catcode'\D=12 \catcode'\:=12
2086 \gdef\pdfx@getYear D:#1#2#3#4{\edef\pdfx@xYear{#1#2#3#4}\pdfx@getMonth}
2087 }
2088 \def\pdfx@getMonth#1#2{\edef\pdfx@xMonth{#1#2}\pdfx@getDay}
2089 \def\pdfx@getDay#1#2{\edef\pdfx@xDay{#1#2}\pdfx@getHour}
2090 \def\pdfx@getHour#1#2{\edef\pdfx@xHour{#1#2}\pdfx@getMin}
2091 \def\pdfx@getMin#1#2{\edef\pdfx@xMin{#1#2}\pdfx@getSec}
2092 \def\pdfx@getSec#1#2{\edef\pdfx@xSec{#1#2}\pdfx@getTZh}
2093 \def\pdfx@getTZh{\futurelet\pdfx@next\pdfx@getTzh@branches}
2094
2095 {\catcode'\@=11 \catcode'\Z=12 \catcode'\+=12 \catcode'\-=12
2096 \gdef\pdfx@getTzh@branches{%
2097 \ifx\pdfx@next Z\let\pdfx@getTzbranch\pdfx@getTznozone
2098 \else\ifx\pdfx@next +\let\pdfx@getTzbranch\pdfx@getTzplus
2099 \else\ifx\pdfx@next -\let\pdfx@getTzbranch\pdfx@getTzminus
2100 \else\let\pdfx@getTzbranch\pdfx@getTzerror
2101 \fi\fi\fi \pdfx@getTzbranch }
2102
2103 \catcode'\0=12
2104 \gdef\pdfx@getTznozone Z#1\pdfx@getTzend{%
2105 \edef\pdfx@xTzh{+00}\edef\pdfx@xTzm{00}}
2106 \gdef\pdfx@getTzplus +#1'#2'#3\pdfx@getTzend{%
2107 \edef\pdfx@xTzh{+#1}\edef\pdfx@xTzm{#2}%
2108 \ifx\relax#2\relax\def\pdfx@xTzm{00}\fi}
2109 \gdef\pdfx@getTzminus -#1'#2'#3\pdfx@getTzend{%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2110 \edef\pdfx@xTzh{-#1}\edef\pdfx@xTzm{#2}%
2111 \ifx\relax#2\relax\def\pdfx@xTzm{00}\fi
2112 %%
2113 %% How to support XeTeX here ?
2114 \expandafter\ifx\csname pdfcreationdate\endcsname\relax
2115 %% \xdef\pdfx@convDate{2016-04-01}% April fool!
2116 %% \xdef\xmp@convDate{2016-04-01}% April fool!
2117 \else
2118 \expandafter\expandafter\expandafter\xmp@convertDate\pdfcreationdate'\pdfx@getTzend
2119 \xdef\pdfx@convDate{\pdfx@xYear\pdfx@xMonth\pdfx@xDay\pdfx@xHour
2120 \pdfx@xMin\pdfx@xSec\pdfx@xTzh'\pdfx@xTzm'}%
2121 \xdef\xmp@convDate{\pdfx@xYear-\pdfx@xMonth-\pdfx@xDay
2122 T\pdfx@xHour:\pdfx@xMin:\pdfx@xSec\pdfx@xTzh:\pdfx@xTzm}%
2123 \fi
2124 }% end of \catcode
2125
2126 %% -----
2127 %% \pdfx@topdfstring\toka\tokb: Convert the string in \tokb to a format
2128 %% appropriate for PDF /Info strings, i.e., PDFDoc encoding or UTF-16
2129 %% encoding, and store the result in \toka As a special case, if \tokb
2130 %% is \@empty, set \toka to \@empty.
2131
2132 \def\pdfx@topdfstring#1#2{%
2133 \ifx#2\@empty
2134 \global\let#1\empty
2135 \else
2136 \begingroup
2137 \ifluatex\else\ifxetex\else
2138 \inputencoding{utf8}%
2139 \fi\fi
2140 \hypersetup{pdfencoding=auto}%
2141 \pdfstringdef#1{#2}%
2142 \endgroup
2143 \fi
2144 }
2145
2146 %% -----
2147 %% if high-bit characters are already encoded as active
2148 %% then \pdfstringdef probably changes their meaning
2149 %% so save these for later reversion.
2150 %%
2151 \newif\ifpdf@activechars
2152 {\ifnum\catcode'^^c0 = 13\relax \aftergroup\pdf@activecharstrue\fi}%
2153 %%
2154 %% normally not used with XeTeX or LuaTeX
2155 %%
2156
2157 \ifpdf@activechars
2158 \global\let\pdfx@save@co ^^c0\relax
2159 \global\let\pdfx@save@ci ^^c1\relax
2160 \global\let\pdfx@save@cii ^^c2\relax
2161 \global\let\pdfx@save@ciii ^^c3\relax
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2162 \global\let\pdfx@save@civ ^^c4\relax
2163 \global\let\pdfx@save@cv ^^c5\relax
2164 \global\let\pdfx@save@cvi ^^c6\relax
2165 \global\let\pdfx@save@cvii ^^c7\relax
2166 \global\let\pdfx@save@cviii ^^c8\relax
2167 \global\let\pdfx@save@cix ^^c9\relax
2168 \global\let\pdfx@save@ca ^^ca\relax
2169 \global\let\pdfx@save@cb ^^cb\relax
2170 \global\let\pdfx@save@cc ^^cc\relax
2171 \global\let\pdfx@save@cd ^^cd\relax
2172 \global\let\pdfx@save@ce ^^ce\relax
2173 \global\let\pdfx@save@cf ^^cf\relax
2174 \global\let\pdfx@save@do ^^d0\relax
2175 \global\let\pdfx@save@di ^^d1\relax
2176 \global\let\pdfx@save@dii ^^d2\relax
2177 \global\let\pdfx@save@diii ^^d3\relax
2178 \global\let\pdfx@save@div ^^d4\relax
2179 \global\let\pdfx@save@dv ^^d5\relax
2180 \global\let\pdfx@save@dvi ^^d6\relax
2181 \global\let\pdfx@save@dvii ^^d7\relax
2182 \global\let\pdfx@save@dviii ^^d8\relax
2183 \global\let\pdfx@save@dix ^^d9\relax
2184 \global\let\pdfx@save@da ^^da\relax
2185 \global\let\pdfx@save@db ^^db\relax
2186 \global\let\pdfx@save@dc ^^dc\relax
2187 \global\let\pdfx@save@dd ^^dd\relax
2188 \global\let\pdfx@save@de ^^de\relax
2189 \global\let\pdfx@save@df ^^df\relax
2190 \global\let\pdfx@save@eo ^^e0\relax
2191 \global\let\pdfx@save@ei ^^e1\relax
2192 \global\let\pdfx@save@eii ^^e2\relax
2193 \global\let\pdfx@save@eiii ^^e3\relax
2194 \global\let\pdfx@save@eiv ^^e4\relax
2195 \global\let\pdfx@save@ev ^^e5\relax
2196 \global\let\pdfx@save@evi ^^e6\relax
2197 \global\let\pdfx@save@evii ^^e7\relax
2198 \global\let\pdfx@save@eviii ^^e8\relax
2199 \global\let\pdfx@save@eix ^^e9\relax
2200 \global\let\pdfx@save@ea ^^ea\relax
2201 \global\let\pdfx@save@eb ^^eb\relax
2202 \global\let\pdfx@save@ec ^^ec\relax
2203 \global\let\pdfx@save@ed ^^ed\relax
2204 \global\let\pdfx@save@ee ^^ee\relax
2205 \global\let\pdfx@save@ef ^^ef\relax
2206 \global\let\pdfx@save@fo ^^f0\relax
2207 \global\let\pdfx@save@fi ^^f1\relax
2208 \global\let\pdfx@save@fii ^^f2\relax
2209 \global\let\pdfx@save@fiii ^^f3\relax
2210 \fi
2211
2212 %% -----
2213 %% detect when \sep is used for multiple authors
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2214 %% then suppress the /Author field in PDF /Info
2215 \newif\ifpdfx@sep@infield@
2216 \let\pdfx@endparse\relax
2217 \def\pdfx@parseforsep#1\sep#2\pdfx@endparse{%
2218   \pdfx@sep@infield@false
2219   \ifx\relax#2\relax\else\pdfx@sep@infield@true\fi
2220 }
2221
2222 \begingroup
2223   \let\CATCODE\catcode
2224   \let\ENDGROUP\endgroup
2225   \let\GDEF\gdef
2226   \CATCODE'\m 12 \CATCODE'\a 12 \CATCODE'\c 12 \CATCODE'\r 12 \CATCODE'\o 12
2227   \CATCODE'\: 12 \CATCODE'\- 12 \CATCODE'\> 12
2228   \GDEF\pdfx@DOSTRIP@MACRO macro:->#1\@{#1}%
2229 \ENDGROUP
2230 \def\pdfx@strip@macro#1{%
2231   \expandafter\edef\expandafter#1\expandafter{%
2232     \expandafter\pdfx@DOSTRIP@MACRO\meaning#1\@}%
2233 }
2234
2235 %% Convert the relevant XMP properties to PDF strings, expanding markup
2236 %% (such as \sep, \&, \copyright, etc) in an appropriate way.
2237 %% These PDF strings are actually not always necessary, but if supplied they
2238 %% must match exactly what is in the XMP version. This may be impossible
2239 %% if math symbols are used; e.g. Plane-1 alphanumerics.
2240 %% Generally, it is better to *not* provide PDF-info strings;
2241 %% instead just providing metadata through XMP.
2242 %% This is not always enough â?? a driver may add it by default!
2243 %%
2244 %% But some PDF readers don't support XMP, so it is nice to have
2245 %% /Info fields, when this can be done reliably.
2246 %%
2247 \begingroup
2248   \RequirePackage{stringenc}%
2249   \expandafter\ifx\cspname pdf@escapehex\endcspname\relax
2250     \PackageWarning{pdfx}{%
2251       Missing an implementation of \string\pdf@escapehex ^^J
2252       Translated Metadata cannot be generated as PDF strings.^^J}%
2253   \def\pdfx@GeneratePdfString#1#2{%
2254     \def\pdfx@ConvertUTFtoBE#1#2{%
2255       \else
2256       \def\pdfx@GeneratePdfString#1#2{%
2257         % converts a UTF-8 string to UTF-16be
2258         \StringEncodingConvert{#1}{#2}{utf8}{utf16be}%
2259         \xdef#1{\string\376\string\377\pdfescapestring{#1}}%
2260       }%
2261       \def\pdfx@ConvertUTFtoBE#1#2{%
2262         \setbox0=\hbox{% catch any rubbish escaping to the MVL
2263         \def\cf@encoding{L8U}\fontencoding{L8U}%
2264         \ifluatex
2265           \let\pdfescapestring\luaescapestring
```



# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
2266 \else\ifxetex\else
2267 \inputencoding{8bit}%
2268 \fi\fi
2269 %% \pdfx@xmpmarkup %% don't want some things
2270 \pdfx@xmpunimarkup
2271 \let\backslash\textbackslash
2272 \edef\pdfx@temp{#2}% ensure XMP expands to UTF8
2273 \pdfx@GeneratePdfString{#1}{\pdfx@temp}%
2274 }%
2275 }%
2276 \fi
2277 \pdfx@pdfmarkup
2278 \global\let\pdfx@pdfAuthor\@empty
2279 \global\let\pdfx@pdfTitle\@empty
2280 \global\let\pdfx@pdfSubject\@empty
2281 \global\let\pdfx@pdfKeywords\@empty
2282 \ifpdfx@nopdfinfo % transliterated strings present
2283 %% RRM: this may still work with parser macros ???
2284 \ifluatex
2285 %% \pdf@escapehex gets it wrong!!
2286 %% Is there a better way ?
2287 \else
2288 \pdfx@ConvertUTFtoBE\pdfx@pdfTitle\xmp@Title
2289 \pdfx@ConvertUTFtoBE\pdfx@pdfSubject\xmp@Subject
2290 \fi
2291 \else
2292 \pdfx@topdfstring\pdfx@pdfTitle\xmp@Title
2293 \ifpdfx@e\else\ifpdfx@x\else
2294 \pdfx@topdfstring\pdfx@pdfSubject\xmp@Subject
2295 \fi\fi
2296 \fi
2297 \pdfx@topdfstring\pdfx@CreatorTool\xmp@CreatorTool
2298 \pdfx@topdfstring\pdfx@Producer\xmp@Producer
2299 %% \pdfescapestring needed
2300 \expandafter\ifx\csname pdfescapestring\endcsname\relax
2301 \else
2302 \expandafter\ifx\expandafter\relax\xmp@Author\relax
2303 \else
2304 %% check for multiple authors with parser macro
2305 \expandafter\pdfx@parseforsep\xmp@Author\sep\pdfx@endparse
2306 \ifpdfx@sep@infield@
2307 \else
2308 \pdfx@ConvertUTFtoBE{\pdfx@pdfAuthor}{\xmp@Author}%
2309 \fi %% end of \ifpdfx@sep@infield@
2310 \fi %% end of \xmp@Author test
2311 \expandafter\ifx\expandafter\relax\xmp@Keywords\relax
2312 \else
2313 %% check for multiple keywords with parser macro
2314 \expandafter\pdfx@parseforsep\xmp@Keywords\sep\pdfx@endparse
2315 \ifpdfx@sep@infield@\else
2316 \ifluatex\else
2317 \pdfx@ConvertUTFtoBE{\pdfx@pdfKeywords}{\xmp@Keywords}%
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2318     \fi
2319     \fi %% end of \ifpdfx@sep@infield@
2320     \fi %% end of \xmp@Keywords test
2321 %%
2322 \fi %% end of \pdfescapestring test
2323 \endgroup
2324
2325 %% Affects CMap creation for certain fonts, according to glyph names
2326 %% How to support XeTeX here ?
2327 %% Maybe it's best to be using an updated mmap.sty ?
2328 \ifxetex
2329 \else
2330   \input glyphtounicode.tex
2331   \input glyphtounicode-cmr.tex
2332   \input glyphtounicode-ntx.tex
2333   \pdfgentounicode=1
2334 \fi
2335 \ifgrkLGRxmp
2336   \ifxetex\else
2337     \pdfglyphtounicode{internalchar2}{200D}%
2338 \fi \fi
2339
2340 %% patch to place accents *after* the base character, rather than before
2341 %% based on coding from mmap.sty by RRM
2342 \newif\ifPDFX@inaccent
2343 \let\LTX@add@accent\add@accent
2344 \def\PDFX@add@accent#1#2{%
2345   \hmode\bgroup
2346   \let \hmode@start@before@group \@firstofone
2347   \setbox\@tempboxa\hbox{\PDFX@inaccenttrue
2348     #2\global\mathchardef\accent@spacefactor\spacefactor}%
2349   #2\kern-\wd\@tempboxa
2350   %% \ifdim\ht\@tempboxa>1ex\relax
2351   \dimen@=\ht\@tempboxa\advance\dimen@-1ex\relax
2352   %% reduce how much a nested accent is raised
2353   \ifPDFX@inaccent\advance\dimen@-.2ex\relax\fi
2354   \raise\dimen@\hbox to\wd\@tempboxa{\hss
2355     \accent#1{\vphantom{#2}}\hss}%
2356   %% \else
2357   %% \accent#1{\vphantom{#2}}
2358   %% \vrule width\z@ height\ht\@tempboxa depth\dp\@tempboxa}%
2359   %% \fi
2360   \egroup
2361   \spacefactor\accent@spacefactor
2362 }
2363
2364 %% How to support XeTeX here ?
2365 %%% adjust accent characters to the Unicode Combining variant %%%
2366 \def\PDFX@combiningchars@unicode{%
2367   \pdfglyphtounicode{grave}{0300}%
2368   \pdfglyphtounicode{acute}{0301}%
2369   \pdfglyphtounicode{circumflex}{0302}%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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- Change History

```
2370 \pdfglyphtounicode{tilde}{0303}%
2371 \pdfglyphtounicode{macron}{0304}%
2372 \pdfglyphtounicode{Macronsmall}{0304}%
2373 \pdfglyphtounicode{breve}{0306}%
2374 \pdfglyphtounicode{dotaccent}{0307}%
2375 \pdfglyphtounicode{Dotaccent}{0307}%
2376 \pdfglyphtounicode{Dotaccentsmall}{0307}%
2377 \pdfglyphtounicode{dieresis}{0308}%
2378 \pdfglyphtounicode{ogonek}{0309}%
2379 \pdfglyphtounicode{ring}{030A}%
2380 \pdfglyphtounicode{hungarumlaut}{030B}%
2381 \pdfglyphtounicode{caron}{030C}%
2382 \pdfglyphtounicode{cedilla}{0327}%
2383 \pdfglyphtounicode{commaaccent}{0326}% droid
2384 % tie accents in berenisadf lm stix and others
2385 \pdfglyphtounicode{tieaccentlowercase}{0311}%
2386 \pdfglyphtounicode{tieaccentcapital}{0361}%
2387 \pdfglyphtounicode{newtieaccentlowercase}{0311}%
2388 \pdfglyphtounicode{newtieaccentcapital}{0361}%
2389 % cm-unicode
2390 \pdfglyphtounicode{space_uni030D}{030D}%
2391 \pdfglyphtounicode{space_uni030E}{030E}%
2392 \pdfglyphtounicode{space_uni030F}{030F}%
2393 \pdfglyphtounicode{space_uni0311}{0311}%
2394 \pdfglyphtounicode{space_uni0321}{0321}%
2395 \pdfglyphtounicode{space_uni0322}{0322}%
2396 \pdfglyphtounicode{space_uni032A}{032A}%
2397 \pdfglyphtounicode{space_uni032B}{032B}%
2398 \pdfglyphtounicode{space_uni0335}{0335}%
2399 \pdfglyphtounicode{space_uni0337}{0337}%
2400 \pdfglyphtounicode{space_uni033A}{033A}%
2401 \pdfglyphtounicode{space_uni033B}{033B}%
2402 \pdfglyphtounicode{space_uni033C}{033C}%
2403 \pdfglyphtounicode{space_uni034D}{034D}%
2404 }
2405
2406 \AtBeginDocument{%
2407 \ifx\add@accent\LT@add@accent
2408 \let\add@accent\PDFX@add@accent
2409 \else
2410 \expandafter\ifx\csname MT@orig@add@accent\endcsname\relax
2411 \TPDF@error{another package has already patched \string\add@accent }%
2412 \else
2413 \expandafter\let\csname MT@orig@add@accent\endcsname\PDFX@add@accent
2414 \fi\fi
2415 \ifxetex
2416 \else
2417 \PDFX@combiningchars@unicode
2418 \@ifpackageloaded{newtxmath}{%
2419 \pdfglyphtounicode{vec}{20D7}%
2420 \pdfglyphtounicode{rvec}{20D6}%
2421 \pdfglyphtounicode{lvec}{20E1}%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

## QUICK LINKS

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- Multilingual and Technical Considerations
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```
2422   }{}%
2423   \fi % end of \ifxetex
2424 }
2425
2426 %% suppress hyperlinks when generating PDF/X
2427 \def\pdfx@linkfile@pdfX#1#2#3{%
2428   \Hy@colorlink\@filecolor#1\Hy@xspace@end}
2429 \def\pdfx@linkstart@pdfX#1#2#3{%
2430   \Hy@colorlink\@linkcolor#3\endgroup\Hy@xspace@end}
2431 \def\pdfx@linkurl@pdfX#1#2{%
2432   \Hy@colorlink\@urlcolor#1\endgroup\Hy@xspace@end}
2433 \def\pdfx@StartlinkName@pdfX#1#2{%
2434   \def\pdfx@close@pdflink{\Hy@VerboseLinkStop\Hy@endcolorlink}%
2435   \def\pdfx@Acrobatmenu@noaction#1#2{#2}
2436
2437 \ifpdfx@x
2438   \let\hyper@linkfile\pdfx@linkfile@pdfX
2439   \let\hyper@linkurl\pdfx@linkurl@pdfX
2440   \let\hyper@linkstart\pdfx@linkstart@pdfX
2441   \let\hyper@linkend\relax
2442   \let\Hy@StartlinkName\pdfx@StartlinkName@pdfX
2443   \let\close@pdflink\pdfx@close@pdflink
2444   \let\AcrobatMenu\pdfx@Acrobatmenu@noaction
2445   \Hy@bookmarksfalse
2446 %% {\def\sep{;}% should not be needed, but just in case
2447 \AtBeginDocument{%
2448   % cancel annotations and links
2449   %
2450   \def\PDF@FinishDoc{% ??? What uses this ???
2451     \begingroup
2452     \def\sep{;}% should not be needed, but just in case
2453     \pdfinfo{%
2454       \ifx\pdfx@pdfTitle\@empty\else /Title(\pdfx@pdfTitle)\fi
2455       \ifx\pdfx@pdfAuthor\@empty\else /Author(\pdfx@pdfAuthor)\fi
2456       \ifx\pdfx@pdfSubject\@empty\else /Subject(\pdfx@pdfSubject)\fi
2457       \ifx\pdfx@pdfKeywords\@empty\else /Keywords(\pdfx@pdfKeywords)\fi
2458       /Creator(\pdfx@CreatorTool)%
2459       \ifx\pdfcreationdate\@empty
2460         /CreationDate(D:\pdfx@convDate)%
2461       \else
2462         \ifxetex\else
2463           /CreationDate(\@pdfcreationdate)%
2464       \fi\fi
2465       \ifx\@pdfmoddate\@empty
2466         /ModDate(D:\pdfx@convDate)%
2467       \else
2468         /ModDate(\@pdfmoddate)%
2469       \fi
2470       /Producer(\pdfx@Producer)%
2471       /Trapped/False
2472       \ifnum\xmp@Part=1
2473         /GTS_PDFXVersion(PDF/X-1\ifnum\xmp@ReleaseDate>2001
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2474         \xmp@Conformance\fi:\xmp@ReleaseDate)%
2475     \else
2476         /GTS_PDFXVersion(PDF/X-\xmp@Part\xmp@Conformance
2477         \ifnum\xmp@Part< 4 :\xmp@ReleaseDate\fi)%
2478     \fi
2479     \ifnum\xmp@Part < 3
2480         /GTS_PDFXConformance(PDF/X-\xmp@Part\xmp@Conformance
2481         :\xmp@ReleaseDate)%
2482     \fi
2483     \ifpdfx@vt
2484 %% support for PDF/VT extensions of PDF/X-4 and PDF/X-5
2485         /GTS_PDFVTVersion(PDF/VT-\xmp@vtPart\xmp@vtConformance)%
2486     \fi
2487 }%% end of PDF/X info
2488 \endgroup %% end of scope for \sep
2489 }%% end of \PDF@FinishDoc
2490 }% end of \AtBeginDocument
2491 %% \pdfinfo{% order of these dictionary keys should not matter
2492 %% \ifx\pdfx@Author\@empty\else /Author(\pdfx@Author)\fi
2493 %% /CreationDate(D:\pdfx@convDate)%
2494 %% /Creator(\pdfx@CreatorTool)%
2495 %% \ifnum\xmp@Part=1
2496 %%     /GTS_PDFXVersion(PDF/X-1\ifnum\xmp@ReleaseDate>2001
2497 %%         \xmp@Conformance\fi:\xmp@ReleaseDate)%
2498 %% \else
2499 %%     /GTS_PDFXVersion(PDF/X-\xmp@Part\xmp@Conformance
2500 %%         \ifnum\xmp@Part< 4 :\xmp@ReleaseDate\fi)%
2501 %% \fi
2502 %% \ifnum\xmp@Part < 3
2503 %%     /GTS_PDFXConformance(PDF/X-\xmp@Part\xmp@Conformance
2504 %%         :\xmp@ReleaseDate)%
2505 %% \fi
2506 %%
2507 %% \ifpdfx@vt
2508 %% support for PDF/VT extensions of PDF/X-4 and PDF/X-5
2509 %%     /GTS_PDFVTVersion(PDF/VT-\xmp@vtPart\xmp@vtConformance)%
2510 %% \fi
2511 %% \ifx\pdfx@Keywords\@empty\else /Keywords(\pdfx@Keywords)\fi
2512 %% /ModDate(D:\pdfx@convDate)%
2513 %% /Producer(\pdfx@Producer)%
2514 %% \ifx\pdfx@Subject\@empty\else /Subject(\pdfx@Subject)\fi
2515 %% \ifx\pdfx@Title\@empty\else /Title(\pdfx@Title)\fi
2516 %% /Trapped/False%
2517 %% }% end of PDF/X info
2518 %% }% end of scope for \sep
2519 \else
2520 \ifpdfx@e %% PDF/E
2521 \AtBeginDocument{%
2522 \def\PDF@FinishDoc{% ??? What uses this ???
2523 \beginingroup
2524 \def\sep{; }% should not be needed, but just in case
2525 \pdfinfo{%
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2526 \ifx\pdfx@pdfTitle\@empty\else /Title(\pdfx@pdfTitle)\fi
2527 \ifx\pdfx@pdfAuthor\@empty\else /Author(\pdfx@pdfAuthor)\fi
2528 \ifx\pdfx@pdfSubject\@empty\else /Subject(\pdfx@pdfSubject)\fi
2529 \ifx\pdfx@pdfKeywords\@empty\else /Keywords(\pdfx@pdfKeywords)\fi
2530 /Creator(\pdfx@CreatorTool)%
2531 \ifx\@pdfcreationdate\@empty
2532 /CreationDate(D:\pdfx@convDate)%
2533 \else
2534 \ifxetex\else
2535 /CreationDate(\@pdfcreationdate)%
2536 \fi\fi
2537 \ifx\@pdfmoddate\@empty
2538 /ModDate(D:\pdfx@convDate)%
2539 \else
2540 /ModDate(\@pdfmoddate)%
2541 \fi
2542 /Producer(\pdfx@Producer)%
2543 /Trapped/False
2544 /GTS_PDFFVersion(PDF/E-1\xmp@Conformance:\xmp@ReleaseDate)%
2545 }% end of PDF/E info
2546 \endgroup %% end of scope for \sep
2547 }% end of \PDF@FinishDoc
2548 }% end of \AtBeginDocument
2549 %% {\def\sep{;}% should not be needed, but just in case
2550 %% \pdfinfo{% order of these dictionary keys should not matter
2551 %% \ifx\pdfx@Title\@empty\else /Title(\pdfx@Title)\fi
2552 %% \ifx\pdfx@Author\@empty\else /Author(\pdfx@Author)\fi
2553 %% \ifx\pdfx@Subject\@empty\else /Subject(\pdfx@Subject)\fi
2554 %% \ifx\pdfx@Keywords\@empty\else /Keywords(\pdfx@Keywords)\fi
2555 %% \ifx\pdfx@Author\@empty\else /Author(\pdfx@Author)\fi
2556 %% /CreationDate(\pdfx@convDate)%
2557 %% /Creator(\pdfx@CreatorTool)%
2558 %% /GTS_PDFFVersion(PDF/E-1\xmp@Conformance:\xmp@ReleaseDate)%
2559 %% \ifx\pdfx@Keywords\@empty\else /Keywords(\pdfx@Keywords)\fi
2560 %% /ModDate(D:\pdfx@convDate)%
2561 %% /Producer(\pdfx@Producer)%
2562 %% \ifx\pdfx@Subject\@empty\else /Subject(\pdfx@Subject)\fi
2563 %% \ifx\pdfx@Title\@empty\else /Title(\pdfx@Title)\fi
2564 %% /Trapped/False%
2565 %% }% end of PDF/E info
2566 %% }% end of scope for \sep
2567 \else %% PDF/A
2568 \def\pdfx@confA{a}%
2569 \def\pdfx@confB{b}%
2570 \def\pdfx@confU{u}%
2571 \expandafter\def\expandafter\xmp@conf\expandafter
2572 {\csname pdfx@conf\xmp@Conformance\endcsname}%
2573 \AtBeginDocument{%
2574 \def\PDF@FinishDoc{% ??? What uses this ???
2575 \begingroup
2576 \def\sep{;} % should not be needed, but just in case
2577 \pdfinfo{%
```



# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2578 \ifx\pdfx@pdfTitle\@empty\else /Title(\pdfx@pdfTitle)\fi
2579 \ifx\pdfx@pdfAuthor\@empty\else /Author(\pdfx@pdfAuthor)\fi
2580 \ifx\pdfx@pdfSubject\@empty\else /Subject(\pdfx@pdfSubject)\fi
2581 \ifx\pdfx@pdfKeywords\@empty\else /Keywords(\pdfx@pdfKeywords)\fi
2582 /Creator(\pdfx@CreatorTool)%
2583 \ifx\@pdfcreationdate\@empty
2584 /CreationDate(D:\pdfx@convDate)%
2585 \else
2586 \ifxetex\else
2587 /CreationDate(\@pdfcreationdate)%
2588 \fi\fi
2589 \ifx\@pdfmoddate\@empty
2590 /ModDate(D:\pdfx@convDate)%
2591 \else
2592 /ModDate(\@pdfmoddate)%
2593 \fi
2594 /Producer(\pdfx@Producer)%
2595 /Trapped/False
2596 /GTS_PDFa1Version (PDF/A-\xmp@Part\xmp@conf:\xmp@ReleaseDate)%
2597 }% end of PDF/A info
2598 \endgroup %% end of scope for \sep
2599 }% end of \PDF@FinishDoc
2600 }% end of \AtBeginDocument
2601 \fi\fi
2602
2603 %%-----
2604 \begingroup
2605 %% override the \ifpdf check of xmpincl package
2606 \ifxetex
2607 \pdftrue
2608 \else\ifluatex
2609 \pdftrue
2610 \fi\fi
2611 \RequirePackage{xmpincl}
2612 \ifxetex
2613 % revert \ifpdf
2614 \pdffalse
2615 \else\ifluatex
2616 \pdffalse
2617 \fi\fi
2618
2619 %% combine coding from xmpincl and hyperxml to support XeTeX
2620 \def\pdfx@xmpincl@xetex#1{%
2621 \IfFileExists{#1.xmp}{%
2622 \mcs@xmpincl@patchFile{#1}%
2623 \begingroup
2624 \special{pdf:fstream @pdfx@Metadata (#1.xmpi)
2625 <<
2626 /Type /Metadata
2627 /Subtype /XML
2628 >>
2629 }%
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2630 \special{pdf:put @catalog
2631 <<
2632   /Metadata @pdfx@Metadata
2633 >>
2634 }%
2635 \endgroup
2636 }{%
2637 \newcommand{\mcs@xmpincl@filename}{#1.xmp}%
2638 \PackageError{xmpincl}%
2639 {The file \mcs@xmpincl@filename\space was not found}%
2640 {The file \mcs@xmpincl@filename\space The metadata file
2641   wasn't found.\MessageBreak Oops.}%
2642 }
2643 }
2644 \ifxetex
2645 \let\includexmp\pdfx@xmpincl@xetex
2646 \fi
2647
2648 %% macro provided by Leonardo E. Segovia on 2017-05-15
2649 %% <leonardo.segovia@cs.uns.edu.ar>
2650 \def\pdfx@xmpincl@luatex#1{%
2651 \IfFileExists{#1.xmp}{%
2652   \mcs@xmpincl@patchFile{#1}%
2653   \begingroup
2654     \pdfcompresslevel=0
2655     \immediate\pdfobj uncompressed stream attr {/Type /Metadata /Subtype /XML}
2656     file{#1.xmpi}%
2657     \pdfcatalog{%\pdfx@LanguageSpec
2658       /Metadata \the\pdflastobj\space 0 R}%
2659     \endgroup
2660 }{%
2661 \newcommand{\mcs@xmpincl@filename}{#1.xmp}%
2662 \PackageError{xmpincl}%
2663 {The file \mcs@xmpincl@filename\space was not found}%
2664 {The file \mcs@xmpincl@filename\space The metadata file
2665   wasn't found.\MessageBreak Oops.}%
2666 }
2667 }
2668 \ifluatex
2669 \let\includexmp\pdfx@xmpincl@luatex
2670 \fi
2671
2672 %%-----
2673 \begingroup
2674 \ifpdfx@x
2675 \ifpdfx@vt
2676 \def\xmp@template{pdfvt}%
2677 \else
2678 \def\xmp@template{pdfx}% formerly pdfx-1a
2679 \fi
2680 \else
2681 \ifpdfx@e
```

# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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```
2682 \def\xmp@template{pdfex}%
2683 \else
2684 \def\xmp@template{pdfa}%
2685 \fi\fi
2686 \catcode'\'=12 \catcode'\<=12 \catcode'\>=12 \catcode'\?=12
2687 \catcode'\|=12 \catcode'\= 12 %% used within the template file
2688 %% patch commands from xmpincl.sty ...
2689 \def\pdfx@xmpinclStart{% supply byte-order marker
2690 <?xpacket begin='^^ef^^bb^^be' id='W5M0MpCehiHzreSzNTczkc9d' ?> %
2691 }%
2692 \def\pdfx@xmpinclStartAlt{% no byte-order marker
2693 <?xpacket begin='' id='W5M0MpCehiHzreSzNTczkc9d' ?> %
2694 }%
2695 \def\pdfx@xmpinclEnd{% allow XMP packet to be writable
2696 <?xpacket end='w'?> %
2697 }%
2698 \let\mcs@xmpinclStart\pdfx@xmpinclStart
2699 \let\mcs@xmpinclStartAlt\pdfx@xmpinclStartAlt
2700 \ifpdfx@noBOM % don't use the byte-order marker
2701 \let\mcs@xmpinclStart\pdfx@xmpinclStartAlt
2702 \fi
2703 \let\mcs@xmpinclEnd\pdfx@xmpinclEnd
2704 %% ... preventing their redefinition
2705 \def\newcommand#1#2{%
2706 %%
2707 %% \def\pdfx@endeval{%
2708 %% \noexpand \TE@setvaltrue \noexpand \else
2709 %% \noexpand \TE@setvalfalse \noexpand \fi
2710 %% \noexpand \TE@negatefalse \noexpand \fi}%
2711 %% \let\TE@endeval\pdfx@endeval
2712 \ifluatex\else\ifxetex\else
2713 \inputencoding{8bit}%
2714 \fi\fi
2715 \makeatletter
2716 \def\cf@encoding{L8U}\fontencoding{L8U}%
2717 \providecommand{\ifnot@empty}[2]{\ifx#1\@empty\relax\else#2\fi}%
2718 \pdfx@xmpmarkup
2719 \expandafter\global\expandafter
2720 \let\csname L8U-cmd\expandafter\endcsname\csname U-cmd\endcsname
2721 \def\cf@encoding{L8U}\fontencoding{L8U}%
2722 \providecommand{\ifnot@empty}[2]{\ifx#1\@empty\relax\else#2\fi}%
2723 \obeyspaces%
2724 %% beware 128 space characters -- for padding end of XMP packet
2725 \gdef\paddingline{
2726 \typeout{Using XMP template file: \xmp@template.xmp}%
2727 \includexmp{\xmp@template}%
2728 \endgroup
2729
2730 %%
2731 %% revert active characters to previous encoding
2732 %%
2733 \ifpdf@activechars
```

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```
2734 \global\let ^c0\pdfx@save@co
2735 \global\let ^c1\pdfx@save@ci
2736 \global\let ^c2\pdfx@save@cii
2737 \global\let ^c3\pdfx@save@ciii
2738 \global\let ^c4\pdfx@save@civ
2739 \global\let ^c5\pdfx@save@cv
2740 \global\let ^c6\pdfx@save@cvi
2741 \global\let ^c7\pdfx@save@cvii
2742 \global\let ^c8\pdfx@save@cviii
2743 \global\let ^c9\pdfx@save@cix
2744 \global\let ^ca\pdfx@save@ca
2745 \global\let ^cb\pdfx@save@cb
2746 \global\let ^cc\pdfx@save@cc
2747 \global\let ^cd\pdfx@save@cd
2748 \global\let ^ce\pdfx@save@ce
2749 \global\let ^cf\pdfx@save@cf
2750 \global\let ^d0\pdfx@save@do
2751 \global\let ^d1\pdfx@save@di
2752 \global\let ^d2\pdfx@save@dii
2753 \global\let ^d3\pdfx@save@diii
2754 \global\let ^d4\pdfx@save@div
2755 \global\let ^d5\pdfx@save@dv
2756 \global\let ^d6\pdfx@save@dvi
2757 \global\let ^d7\pdfx@save@dvii
2758 \global\let ^d8\pdfx@save@dviii
2759 \global\let ^d9\pdfx@save@dix
2760 \global\let ^da\pdfx@save@da
2761 \global\let ^db\pdfx@save@db
2762 \global\let ^dc\pdfx@save@dc
2763 \global\let ^dd\pdfx@save@dd
2764 \global\let ^de\pdfx@save@de
2765 \global\let ^df\pdfx@save@df
2766 \global\let ^e0\pdfx@save@eo
2767 \global\let ^e1\pdfx@save@ei
2768 \global\let ^e2\pdfx@save@eii
2769 \global\let ^e3\pdfx@save@eiii
2770 \global\let ^e4\pdfx@save@eiv
2771 \global\let ^e5\pdfx@save@ev
2772 \global\let ^e6\pdfx@save@evi
2773 \global\let ^e7\pdfx@save@evii
2774 \global\let ^e8\pdfx@save@eviii
2775 \global\let ^e9\pdfx@save@eix
2776 \global\let ^ea\pdfx@save@ea
2777 \global\let ^eb\pdfx@save@eb
2778 \global\let ^ec\pdfx@save@ec
2779 \global\let ^ed\pdfx@save@ed
2780 \global\let ^ee\pdfx@save@ee
2781 \global\let ^ef\pdfx@save@ef
2782 \global\let ^f0\pdfx@save@fo
2783 \global\let ^f1\pdfx@save@fi
2784 \global\let ^f2\pdfx@save@fii
2785 \global\let ^f3\pdfx@save@fiii
```

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```
2786 \fi
2787
2788 \endgroup
2789
2790 %%
2791 %% controls the color model and conversions with xcolor package
2792 %%
2793 \ifpdfx@cmlyk
2794 %
2795 % this will have been done already for PDF/X
2796 %
2797 \PassOptionsToPackage{xcolor}{cmlyk,hyperref}
2798 \def\pdfx@handlexcolor{\def\@mod{cmlyk}\selectcolormodel{cmlyk}%
2799 \convertcolorsUtrue\convertcolorsDtrue}
2800 \ifpdfx@x
2801 \else
2802 %% \AtBeginDocument{%
2803 %% \def\@linkcolor{0 1 1 0}%
2804 %% \def\@anchorcolor{0 0 0 1}%
2805 %% \def\@citecolor{1 0 1 0}%
2806 %% \def\@filecolor{.5 0 0 .5}%
2807 %% \def\@urlcolor{0 1 0 0}%
2808 %% \def\@menucolor{0 1 1 0}%
2809 %% \def\@runcolor{.5 0 0 .5}%
2810 %% \def\@linkbordercolor{0 1 1 0}%
2811 %% \def\@citebordercolor{1 0 1 0}%
2812 %% \def\@filebordercolor{.5 0 0 .5}%
2813 %% \def\@urlbordercolor{1 0 0 0}%
2814 %% \def\@menubordercolor{0 1 1 0}%
2815 %% \def\@runbordercolor{.7 0 0 .3}%
2816 %% \def\Fld@bcolor{0 0 0 0}%
2817 %% \def\Fld@bordercolor{0 1 1 0}%
2818 %% }
2819 \fi
2820 \else
2821 \PassOptionsToPackage{xcolor}{rgb,hyperref}
2822 \def\pdfx@handlexcolor{\def\@mod{rgb}\selectcolormodel{rgb}%
2823 \convertcolorsUtrue\convertcolorsDtrue}
2824 \fi
2825 \@ifpackageloaded{xcolor}{\pdfx@handlexcolor
2826 \ifpdfx@cmlyk\else\color{black}\fi}{%
2827 \AtBeginDocument{\@ifpackageloaded{xcolor}{\pdfx@handlexcolor}{}}
2828 }
2829
2830 %%-----
2831 %% Disable some actions in Beamer navigation
2832 \@ifclassloaded{beamer}{%
2833 \let\real@insertslidenavigationsymbol
2834 \insertslidenavigationsymbol
2835 \let\real@insertbackfindforwardnavigationsymbol
2836 \insertbackfindforwardnavigationsymbol
2837 \def\pdfx@insertslidenavigationsymbol{%
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2838 \let\Acrobatmenu\pdfx@Acrobatmenu@noaction
2839 \real@insertslidenavigationsymbol
2840 }}%
2841 \def\pdfx@insertbackfindforwardnavigationsymbol{%
2842 \let\Acrobatmenu\pdfx@Acrobatmenu@noaction
2843 \real@insertbackfindforwardnavigationsymbol
2844 }}%
2845 \AtBeginDocument{%
2846 \ifHy@pdfa
2847 \let\insertslidenavigationsymbol
2848 \pdfx@insertslidenavigationsymbol
2849 \let\insertbackfindforwardnavigationsymbol
2850 \pdfx@insertbackfindforwardnavigationsymbol
2851 \fi}%
2852 {}%
2853
2854 %%-----
2855 \ifpdfx@transliterated
2856 %% support for bookmarks with transliterated input
2857 \RequirePackage{stringenc}
2858 \ifxetex\let\pdf@escapehex\empty\fi % don't need it
2859 \expandafter\ifx\csname pdf@escapehex\endcsname\relax
2860 \PackageWarning{pdfx}{%
2861 Missing an implementation of \string\pdf@escapehex ^^J
2862 Translated Bookmarks cannot be generated.^^J}%
2863 \newcommand{\pdfxBookmark}[4][{}]{#2[#1]{#4}}%
2864 \else
2865 \def\pdfx@GeneratePdfString#1#2{%
2866 % converts a UTF-8 string to UTF-16be
2867 \StringEncodingConvert{#1}{#2}{utf8}{utf16be}%
2868 \edef#1{\string\376\string\377\pdfescapestring{#1}}%
2869 }
2870 \newtoks\pdfx@DisabledCommands
2871 \def\pdfxDisableCommands#1{%
2872 \expandafter\pdfx@DisabledCommands
2873 \expandafter{\the\pdfx@DisabledCommands#1}}
2874 \pdfxDisableCommands{%
2875 \def\80{% else \000\(\ --> \000\80\050 \000\000\050
2876 \aftergroup\let\aftergroup\HyPsd@ConvertToUnicode\aftergroup\@gobble}
2877 \let\Hy@@writetorep\@writetorep
2878 \def\pdfx@@writetorep#1#2#3#4#5{%
2879 \begingroup
2880 \pdfx@xmpunimarkup
2881 \pdfx@prebookmark
2882 \edef\pdfstringdefPreHook{\pdfstringdefPreHook
2883 \the\pdfx@DisabledCommands}%
2884 \Hy@@writetorep{#1}{#2}{#3}{#4}{#5}%
2885 \endgroup
2886 }
2887 \newcommand{\pdfxBookmark}[4][{}]{%
2888 \ifx\relax#3\relax
2889 \PackageError{pdfx}{Unknown macro \string#3.
```



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```
2890     A proper bookmark cannot be created}%
2891     {Proceed to process the \string#1 as usual.}%
2892     #2{#4}%
2893 \else
2894 \ifluatex % use the utf8 directly
2895 \let\pdfx@temp#3\relax
2896 \def\pdfx@prebookmark{%
2897 \pdfx@DisabledCommands{}%
2898 \let#3\pdfx@temp
2899 }%
2900 \else\ifxetex % use the utf8 directly
2901 \let\pdfx@temp#3\relax
2902 \def\pdfx@prebookmark{%
2903 \pdfx@DisabledCommands{}%
2904 \let#3\pdfx@temp
2905 }%
2906 \else
2907 % convert the utf8 to utf16be
2908 \pdfxBookmarkString\pdfx@temp{#3}%
2909 \fi\fi
2910 \let\@@writetorep\pdfx@@writetorep
2911 \ifx\empty#1\empty
2912 \def#3{#4}%
2913 #2{#3}%
2914 \else
2915 \def#3{#1}%
2916 #2[#3]{#4}%
2917 \fi
2918 \let\@@writetorep\Hy@@writetorep
2919 \fi
2920 \ignorespaces
2921 }
2922 %% use as: \pdfxBookmark{\section}{\sectAtitle}{...}
2923 %% use as: \pdfxBookmark[<opt-title>]{\section}{\sectAtitle}{...}
2924 %% only needed by pdfTeX --- Lua-/XeTeX use the utf8 directly
2925 \def\pdfxBookmarkString#1#2{%
2926 \pdfx@GeneratePdfString#1{#2}%
2927 \def\pdfx@prebookmark{%
2928 \pdfxDisableCommands{\let#2#1}%
2929 }%
2930 }
2931 %% use as: \pdfxBookmarkString\PdfSectA\sectAtitle
2932 %% where \sectAtitle has been defined by e.g.
2933 %% \pdfxEnableCommands{\xdef\sectAtitle{\textLGR{...}}}
2934
2935 \fi % end of \ifx\pdf@escapehex\relax
2936 \fi % end of \ifpdfx@transliterated
2937
2938 %%-----
2939
2940 %% disable hyperref options,
2941 %% to prevent changes that will cause an incompatibility
```

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```
2942 \Hy@DisableOption{pdfauthor}%
2943 \Hy@DisableOption{pdftitle}%
2944 \Hy@DisableOption{pdfsubject}%
2945 \Hy@DisableOption{pdfcreator}%
2946 \Hy@DisableOption{pdfcreationdate}%
2947 \Hy@DisableOption{pdfmoddate}%
2948 \Hy@DisableOption{pdfproducer}%
2949 \Hy@DisableOption{pdfkeywords}%
2950 %% once set correctly, don't let this change
2951 \Hy@DisableOption{pdfa}\let\Hy@pdfafalse\relax\let\Hy@pdfatruerelax
2952 \endinput
2953 %%
2954 %% End of file 'pdfx.sty'.
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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# Generation of PDF/X- and PDF/A-compliant PDFs with pdfT<sub>E</sub>X—pdfx.sty

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## 8. Change History

<b>v1.00</b>	General: Initial commit to the CVS. . . . .	1
<b>v1.01</b>	General: glyphtounicode-cmr.tex included with the package. . . . .	1
<b>v1.3</b>	General: Fix copyright in xmp files. . . . .	1
<b>v1.5.4</b>	General: Fixed timezone bug; Unicode support; more PDF variants; added color profiles. . . . .	1
<b>v1.5.5</b>	General: Support for PDF/X-4p and PDF/X-5pg with external color profiles. . . . .	1
<b>v1.5.6</b>	General: Suppressed ‘dummy-space’ font warning; removed spurious ‘?’ in XMP packets; improved handling of Color Profiles; ensure Hy@pdfatruue when building PDF/A, for link flags; properly enables xcolor conversion of color models. . . . .	1
<b>v1.5.7</b>	General: Removed UTF-8 characters that appear in the documentation only, within comments in the package source, but result in a validation failure. Language support in XMP metadata. Added macros for Windows and Mac system color profile directories. . . . .	1
<b>v1.5.8</b>	General: MediaBox, TrimBox, etc. derived from the paperheight, paperwidth. Improved language support, incl. KOI8-R encoded cyrillics, Armenian OT6, and LGR Greek encoding, incl. polytonic Greek. All the encodings Latin-1–9 are supported for upper 8-bit characters. Fixed the quoted file-name problem, evident with LuaTeX. Method to generate correct bookmarks with non-active (transliterated) input. Added support for XeLaTeX, improvements with LuaTeX. Updated documentation. . . . .	1
<b>v1.5.82</b>	General: Adjusted to changes in the LaTeX core, affecting macros for composite commands; incl. \textsuperscript and others. . . . .	1
<b>v1.5.83</b>	General: Improved support for XeLaTeX and LuaLaTeX. . . . .	1
<b>v1.5.84</b>	General: Fully expand options for hyperref. Better support for extended IPA letters and modifiers. Adjusted release versions and dates. . . . .	1
<b>v1.5.85</b>	General: Fixed bugs, and fully implemented L8U as a pseudo-encoding; renamed L8U files into the form *-penc.def . . . . .	1
<b>v1.6</b>	General: Added XMP support for PDF/UA-1. Added more Metadata fields and Language support. Default RGB and CMYK profiles now require the colorprofiles.sty package. Added file CallasColorProfiles.tex . Revised glyphtounicode.sty to use variation selectors, altered maps to PUA codepoints; added more glyphs via glyphtounicode-ntx.tex . Support for 8-bit Hebrew encodings, some Arabic and Devanagari. Updated documentation, incl. for LaTeX changes. . . . .	1