Guide to Imfufa LaTeX 3.2

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Abstract

Imfufa LaTeX is a collection of LaTeX document classes that are being developed at Imfufa.[1] The original purpose was to provide classes suitable for writing texts in Danish. That was long ago, before the babel, inputenc and fontenc packages were introduced and made it very easy to write texts in 'any' language. During the years many stylistic adjustment and a few new commands have been added to Imfufa LaTeX, so although the 'language problem' hasn't been a problem for several years, Imfufa LaTeX still has its *raison d'être*.

While the first versions were add-ons to Leslie Lamport's standard classes, Imfufa LaTeX is now made as an extension of of Peter Wilson's memoir class. The present paper only describes the *extra* features that Imfufa LaTeX provides. If you are going to use Imfufa LaTeX, it is highly recommended that you also consult Peter Wilson's comprehensive manual to the memoir class.

Imfufa LaTeX is available from http://dirac.ruc.dk/imfufalatex/

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[1] Imfufa (1978-2006) was an acronym for *Institut for studiet af Matematik og Fysik samt deres Funktioner i Undervisning, Forskning og Anvendelser*, that is, Department for the Study of Mathematics and Physics and Their Functions in Teaching, Research and Applications.

Contents

1 The document classes

IMFUFA LaTeX defines the following five document classes which are all build on top of the memoir class: imfbook (books), imfreport (technical reports), imfart (articles), imfnote (shorter notes), and imfletter (letters). These classes always

- use the T1 font encoding,
- load the babel package with support for the Danish language – but other languages can also be loaded, see item 2 on page 6,
- set the input encoding to `ansinew` – but another input encoding can be selected using `\inputencoding{`⟨*encoding*⟩`}`,
- use Latin Modern Roman as the default font – but by giving a single option you can switch to Palatino, Times and others, all with suitable math fonts (see item 1a below).

Since these classes all load Peter Wilson's memoir class [3], you can of course also use the commands and options of that class.

1.1 Documentclass options

1. Options related to fonts.

   a) By default the Latin Modern fonts are used. The user can change this with one of the following options:
      - `palatino`: use Palatino as the serif font. In fact the Pagella font (part of TeX Gyre) will be used if available. The virtual Mathpazo fonts are used for math. The leading is increased (e.g. 10/12 is changed to 10/13). – See also Box 1.1 on the next page.
      - `palatino9`: use the FPL-Neu version of Palatino, and Euler as math font.
      - `fourier`: use Fourier-GUT*enberg* with Utopia as the serif font.
      - `fouriernc`: use Fourier-GUT*enberg* with New Century Schoolbook as the serif font.
      - `times`: use Times as the serif font. In fact the Termes font (part of TeX Gyre) will be used if available. The virtual Mathptmx font is used for math. – See also Box 1.2 on the next page.
      - `ccfonts`: use Concrete for normal text *and* math, and Latin Modern sans serif semibold condensed is used as the bold family.

   b) With the option `pplleading` you can select the leading used with Palatino.

The documentclass option `palatino` selects Palatino as the main font. If the TeX Gyre fonts are installed, then the Imfufa LaTeX will use Pagella. This means that characters such as €, № and ° are available, as well as "old style" numbers (as in 1685-1750).

Box 1.1 The Pagella font

The documentclass option `times` selects Times as the main font. If the TeX Gyre fonts are installed, then the Imfufa LaTeX will use Termes. This means that characters such as €, № and ° are available, as well as "old style" numbers (as in 1685-1750).

Box 1.2 The Termes font

c) Some font families have more than one bold version. The standard Latin Modern Roman for example, comes with a **bold** and a **bold extended** version, and the default LaTeX behaviour is to map `\bfseries` (and `\textbf`) the the bold extended version.

The Imfufa LaTeX documentclasses, however, generally use the more elegant bold non-extended version, except in part and chapter headings. (A minor drawback of this is that cmr has no bold non-extended *italic* version.)

The option `boldx` switches back to the original LaTeX version (i.e. bold = bold extended), whereas the option `noboldx` means never use bold extended (if a bold non-extended is available).

See also the section "The meaning of 'bold'" on page 7.

2. babel options.

The babel package is loaded with Danish as default language. The user can give any other languages she wants as documentclass options, but due to the way LaTeX handles documentclass options, the list of languages must include Danish, and the main language must be the last one in the list. Thus, if you are going to write a document in German with some quotations in Upper Sorbian, you would have to write something like

`\documentclass[danish,uppersorbian,ngerman]{imfbook}`

3. Mathematics: The option `amsmath` loads the amsmath package.

(The reason why there is a special option for loading the amsmath package is that the Imfufa LaTeX classes always load the amsthm package, and if a document uses both of the packages amsmath and amsthm, then amsmath has to be loaded *before* amsthm.)

1.2 Commands related to fonts

Text companion fonts

Imfufa LaTeX always loads the standard commands for accessing the various glyphs

from the companion fonts, thus you can produce glyphs such as №, ⅟, © and ® using the commands `\textnumero`, `\textdiscount`, `\textcopyright` and `\textregistered`. Imfufa LaTeX also defines some extra commands:

- The font declaration `\tcfont` and the font command `\textco` select the *text companion font*. Example: `\textco{[23]}` produces ⟦23⟧.

- The Euro symbol € is produced by the standard command `\texteuro` or the Imfufa LaTeX command `\euro` which can be used both in text and math mode. Usually you can also produce the Euro symbol simply by pressing the € key.[1]

- The perthousand symbol ‰ is produced by the command `\perthousand` or `\promille`. These commands can be used in both text and math mode.

- The command `\celsius` produces the °C symbol (in text or math mode)

Changing the absolute typesize

Usually the normal type size together with the relative size commands (`\large`, `\small` etc.) is set once and for all through a document class option such as 12pt. The user might however want to change the normal type size (for example to set the appendices in a smaller size). The command `\setnormalsize` can be used for this purpose. It takes a single argument which should be the point size (i.e. one of the memoir point sizes 9, 10, 11, 12, 14 or 17). Example: `\setnormalsize{9}`

The meaning of 'bold'

As described on page 6 (item 1c) Imfufa LaTeX uses two bold versions, bold and bold extended.

The font command `\textbx` (and the corresponding font declaration `\bxseries`) always selects the **bold extended** version (except when the option noboldx is given).

The font command `\textbn` (and the corresponding font declaration `\bnseries`) always selects the **bold non-extended** version.

Paragraphs

The command `\par` (or its alias 'one or more lines whith whitespace') starts a new paragraph. In ordinary text this is by default (in the standard LaTeX classes as well as in memoir) done by skipping to the next line and making a certain indentation.

In some kinds of text, however, it is desirable to mark new paragraphs by inserting some extra vertical space but no indentation. The command `\imfufapar` switches to this paragraph style (within the current group).

1.3   The layout

There are some general adjustments of the layout common to all classes:

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[1] Linux users need to switch to the Latin 9 encoding (ISO-8859-15) (and use `\inputencoding{latin9}`) or Unicode (and use `\inputencoding{utf8}`).

- Footnotes are written like this.[2]

- The `quotation` environment is redefined so that is does not indent its first line.

- Lists are typeset using `\tightlists` (from the memoir class) as the default list style. (Other possibilities are `\defaultlists` (the classical LaTeX style) and `\firmlists`.)

- You can change the font used to typeset the labels in description environments with the command `\descriptionlabelfont{⟨fontcommands⟩}`. Example: `\descriptionlabelfont{\normalfont\scshape}`

- Captions in figures, tables and other floats are typeset in `\small`; short captions are centered.

The page layout

The paper format is supposed to be A4.

A common rule of thumb is that the text height should be 2/3 of the paper height, and the text width should be 2/3 of the paper width. We use this in the imfreport and imfnote classes. It is easier to read lines that are not too long, so in the imfbook class the textwidth is slightly smaller (5/9 of the paper width). The lower margin is twice the upper margin, and the outer margin is twice the inner margin (with twosided printing). Letters (section 2.2) have longer lines.

Books and reports

– pagestyles

The default page style in the document classes imfbook and imfreport is lheadings which prints an underlined header with section and chapter information and the folio. We also provide a page style Lheadings which is similar to lheadings, except that the header rule extends into the outer margin, as in the standard pagestyle companion.

The standard pagestyle plain writes the folio centered at the bottom of the page. In the imfbook and imfreport classes we also define a pagestyle lplain which writes the folio at the outside of the page (with twosided printing).

– chapterstyles

In imfbook and imfreport we define a new chapterstyle section1 which is a slightly modified version of the section chapter style (the font size is `\huge` instead of `\Huge`, and it puts an emspace between the number and the name of the chapter). This chapterstyle is the default.

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[2] The memoir class has a number of commands that make it easy to change the appearence of footnotes, see section 13.1 of the memoir manual [4].

1.4   Boxes

The environment fmpage produces a *framed minipage*. It has (like a minipage) one
mandatory argument ⟨*width*⟩ and one optional argument ⟨*pos*⟩ which defaults to c. The
frame around the minipage is created by the standard command `\fbox`, thus you can
change `\fboxrule` and `\fboxsep` to adjust the appearance of the fmpage.

This is an fmpage of width 15em:
> Wer immer strebend sich bemüht,
> den können wir erlösen.

Furthermore, there are two float environments ibox and jbox which both put all their
material in a framed box. The difference is that an ibox has its caption inside the frame
(as in Box 1.1 on page 6) whereas a jbox has its caption below the frame (as in Box 2.2
on page 14). Furthermore the jbox caption can only be a simple caption (no optional
arguments or subcaptions etc.).

The default width of an ibox or ibox is `\textwidth`. You can cange the width by
changing the length `\jboxwidth`.

Of course you can also use the framed boxes defined in the memoir class, see section
16.3 of [4].

1.5   Some useful commands

Quotation marks

To put quotation marks around some piece of text, you should use `\enquote{`⟨*text*⟩`}`.[3]
(`\enquote` is defined in Philipp Lehman's csquotes package [2] which is loaded by
IMFUFA LATEX.)

One of the advantages of `\enquote` is that it can use information from the babel package
and thus the quote style will be language dependent. Here is an example with English
and Danish; the input lines

```
% (the main language is english)
He said: \enquote{This is my \enquote{new} car.}

\begin{otherlanguage*}{danish}%
  Han sagde: \enquote{Det er min \enquote{nye} bil.}
\end{otherlanguage*}
```

give

> He said: "This is my 'new' car."

> Han sagde: »Det er min 'nye' bil.«

---

[3] Earlier versions of IMFUFA LATEX defined a similar command `\textqm`, but `\enquote` is in all respects the
better of the two. For compatibility reasons we now define `\textqm` to be an alias for `\enquote`.

Nicer fractions

The command `\nicefrac{⟨top⟩}{⟨bottom⟩}` typesets fractions of the form $^8/_{13}$. The command can be used in text and math mode.

Text example: `\textbf{\nicefrac{8}{13}}` gives **$^8/_{13}$**.

Math example: `$e^{-\nicefrac{8}{13}}$` gives $e^{-8/13}$.

Empty pages

`\emptypages{⟨noofpages⟩}` inserts ⟨*noofpages*⟩ pages without text but with header and footer according the current page style. `\emptypages{0}` is the same as `\clearpage`. (See also [4, section 17.12].)

Ragged right

The command `\RaggedRight` is a less ragged version of the standard LaTeX command `\raggedright`.

dvs.

In (older) Danish books you can see the glyph ɔ: which means "i.e." or "that is" (in Danish "det vil sige"). The glyph is produced with the command `\dvs`

1.6   Some math commands

Imfufa LaTeX provides some useful maths commands.

- *n*-tuples:

  The command `\ntup` makes generalized '*n*-tuples': `\ntup[⟨bin.op⟩]{⟨x⟩}{⟨n⟩}` prints $x_1⟨bin.op⟩x_2⟨bin.op⟩\ldots⟨bin.op⟩x_n$; the default value of the binary operator ⟨*bin.op*⟩ is `,␣`.

  Examples: `$\ntup{x}{n}$`   gives $x_1, x_2, \ldots, x_n$

  `$\ntup[+]{y}{m}$`   gives $y_1 + y_2 + \cdots + y_m$

  `$\ntup[\,]{z}{k}$`   gives $z_1 z_2 \ldots z_k$

  `$\ntup[\cup]{A}{d}$`   gives $A_1 \cup A_2 \cup \cdots \cup A_d$

- The number sets:

  The commands `\N`, `\Z`, `\Q`, `\R` and `\C` can be used to print symbols for the natural numbers, the integers, the rationals. the reals and the complex numbers, using some kind of Blackboard Bold font (as given by the command `\mathbb`). If you have loaded the amsfonts package they will look like this: $\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{R}, \mathbb{C}$.

- For the statistician:

  In standard LaTeX the 'probability' command `\Pr` prints something like Pr. In Denmark (and many other countries) 'probability' is usually written simply as a P, so Imfufa LaTeX redefines `\Pr` to print a P.

We also define a command `\Exp` for 'expectation' and `\Var` for 'variance'. (`\Pr`, `\Exp` and `\Var` are of course defined as math operators, and sub- and superscripts are placed correctly, e.g. $P_n(A) \to P(A)$.)

Binomial coefficients such as $\binom{n}{k}$ are generated by `\binom{⟨n⟩}{⟨k⟩}`.

- Misc.:
    - The standard commands `\Re` and `\Im` (for the real and the imaginary part of a complex number) are redefined to Re and Im.
    - `\eps` is defined to be a short form for `\varepsilon` (ε).
    - The command `\ton` is similar to the Standard LaTeX command `\not`, except that `\ton` puts a backslash over its argument where `\not` uses a forward slash. Examples: `$\ton=$` and `$\ton\subset$` give ≠ and ⊄.

1.7 Theorems and proofs

The IMFUFA LaTeX classes (except imfletter) load the amsthm package and make a slight modification of some of its commands, so that theorem-like structures can have an 'end-of-theorem'-mark.

IMFUFA LaTeX defines three theorem styles: ibreak, idefinition and iproof, and two 'theorem-like structures': theorem and proof (using theorem style ibreak and iproof, respectively). The default theorem style is ibreak.

Theorems and proofs look like this:

Theorem 1.1
The default theorem style ibreak writes the body in italic and has a break after the header.

Proof
A proof is simply a theorem-like structure that uses the theorem style iproof. □

Theorem 1.2: tough
Every theorem-like structure can have an optional argument.

Here Theorem 1.2 was made as follows:

```
\begin{theorem}[tough]
  Every theorem-like structure can have an optional argument.
\end{theorem}
```

Using (`\theoremstyle` and) `\newtheorem` you can define your own theorem-like structures.

Example: An example environment with the body text written in upright shape can be defined in this way:

```
\theoremstyle{idefinition}
\newtheorem{example}{Eksempel}
```

If you use `\newtheorem*` instead of `\newtheorem`, then the structure becomes unnumbered.

(For more details see [1].)

2 Two special classes

2.1 The imfnote class

The imfnote class is intended for shorter notes.

The command `\maketitle` produces a 'titlepage' with a ⟨*title*⟩, a ⟨*location*⟩ top left, and an ⟨*author*⟩ top right on the first page; each may consist of several lines separated by `\\`. The user commands `\author{`⟨*author*⟩`}`, `\location{`⟨*location*⟩`}` and `\title[`⟨*shorttitle*⟩`]{`⟨*title*⟩`}` assign the desired values. – The default values of ⟨*author*⟩, ⟨*location*⟩ and ⟨*title*⟩ are `\today`, `Roskilde` and `\ttfamily[title]`; ⟨*shorttitle*⟩ defaults to ⟨*title*⟩.

Subsequent pages will be typeset using the pagestyle nheadings which has a header containing ⟨*shorttitle*⟩ and the folio. If you don't like nheadings, you can try nplain (or plain).

Here is a simple example:

```
\documentclass[english]{imfnote}

\author{Ole Olsen\\ \today}
\location{Copenhagen\\ Denmark}
\title{Warning}

\begin{document}
\maketitle

Do remember her birthday tomorrow,
or you'll never see the day after tomorrow!

\end{document}
```

2.2 Letters

The imfletter class defines a letter environment that typesets letters that are compatible with Danish standards.

The first page of the letter is typeset in a special letter paper format and can contain a number of data about the sender and the addressee, cf. Box 2.2. The next pages are typeset using pagestyle tplain. If the letter consists of only one page, the body of the letter is centered vertically. The `\closing` command can have an optional argument

```
\documentclass{imfletter}

%% all of these items are optional:
  \name{⟨name⟩}
  \address{⟨address⟩}
  \signature{⟨signature⟩}
  \date{⟨date⟩} % default is \today
  \telephone{⟨phone number⟩}
  \fax{⟨fax number⟩}
  \email{⟨e-mail⟩}
  \homepage{⟨homepage⟩}
  \location{⟨room number⟩}
  \journal{⟨sender's journal number⟩}
  \yourreference{⟨the addressee's journal number⟩}

\begin{document}
\begin{letter}{⟨the addressee's name and address⟩}
  \opening{⟨text⟩} % e.g.  Dear Richard,
    ⟨the body of the letter⟩
  \closing{⟨text⟩} % e.g.  Best regards
\end{letter}
\end{document}
```

Box 2.1 A letter template.

⟨*pos*⟩ specifying the horizontal position; possible values are c, l and r (center, left and right), default is c. Example: `\closing[l]{Pax et bonum}` will place the signature to the left on the page.

Letter styles

A imfletter document can read one or more *letter style files* (with extension ils), using the command `\letterstyle{⟨ils-file⟩}` somewhere before `\begin{letter}`. The letter style file can contain any number of commands modifying the normal behaviour of the class. Examples:

1. You can put all the \name, \address etc. commands in a ils file. Then you need only write a single \letterstyle command instead of the whole lot of commands, and the same person can easily change his identity, simply by using a different letter style file.

2. The ils file can contain commands that modify or totally change the layout of the first page of the letter. It requires some expert knowledge, however, to write such a ils file.

   The different items on the first page are written in a picture environment with unit length 1pt and with the upper left corner of the paper as origo.

   To change the layout you should redefine one or more of the commands \printletterhead, \printsenderinfo, \printdate, \printaddressee and \printletterfoot (and nothing else). You can see the default definitions of these commands in the imfletter.cls file.

3 Other

3.1 Re. babel

Imfufa LaTeX comes with a few babel configuration files with (new or adjusted) translations of test strings used in Imfufa LaTeX and memoir.

For the language Danish we also define an extra shorthand `"/` that behaves the same way as the standard `"-`, except that it writes a `/` instead of a `-`. Thus words like *differentiation/integration* can be hyphenated correctly.

For the language Danish we also redefine `\-` so that it now marks an *extra* position where hyphenation allowed (in standard LaTeX it marks the *only* place where hyphenation is allowed).

Bibliography

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