

Guide to IMFUFA L^AT_EX 3.2

Jørgen Larsen
Roskilde University
Denmark

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Abstract

IMFUFA L^AT_EX is a collection of L^AT_EX 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 L^AT_EX, so although the ‘language problem’ hasn’t been a problem for several years, IMFUFA L^AT_EX still has its *raison d’être*.

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

IMFUFA L^AT_EX is available from <http://dirac.ruc.dk/imfufalatem/>

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.

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1 The document classes

IMFUFA L^AT_EX 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/Computer Modern Roman as the default font – but by giving a single option you can switch to Palatino, Times or Concrete, 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.
Palatino is used as the serif font and Helvetica as the sans serif font. The virtual Mathpazo font is used as math font. 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-GUTenberg with Utopia as the serif font.
- `fouriernc`: use Fourier-GUTenberg with New Century Schoolbook as the serif font.
- `times`: use Times.
Times is used as the serif font and Helvetica as the sans serif font. The virtual Mathptmx font is used as math font.
- `ccfonts`: use Concrete.
Concrete is used for normal text *and* math, and Latin or Computer Modern sans serif semibold condensed is used as the bold family.

The documentclass option `palatino` selects Palatino as the main font. If the **FPL** fonts and version 9.2 of **psnfss** are installed, then the IMFUFA L^AT_EX will use these. This means that we get true SMALL CAPS (instead of scaled capitals), and in text mode we get the “old style” numbers (such as in 1685-1750).

Box 1.1 The Palatino font

- **nolmodern**: don’t use Latin Modern, but European Computer Modern.
- b) With the option **pplleading** you can select the leading used with Palatino.
- c) Some font families have more than one bold version. The standard Computer Modern Roman for example, comes with a **bold** and a **bold extended** version, and the default L^AT_EX behaviour is to map `\bfseries` (and `\textbf`) the the bold extended version.

The IMFUFA L^AT_EX 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 L^AT_EX 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 L^AT_EX 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 L^AT_EX 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 L^AT_EX always loads the standard commands for accessing the various glyphs from the companion fonts, thus you can produce glyphs such as \aleph , $\%$, \copyright and \textregistered using the commands `\textnumero`, `\textdiscount`, `\textcopyright` and `\textregistered`. IMFUFA L^AT_EX 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 L^AT_EX 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)

Oldstyle numbers

The command `\oldstylenums` is redefined so that it uses the glyphs from the text companion font. Example: `{\bfseries The value is \oldstylenums{3.14}}` gives **The value is 3.14**.

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 L^AT_EX 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 with whitespace’) starts a new paragraph. In ordinary text this is by default (in the standard L^AT_EX 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 Linux users need to switch to the Latin 9 encoding (ISO-8859-15) (and use `\inputencoding{latin9}`) or Unicode (and use `\inputencoding{utf8}`).

1.3 The layout

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

- Footnotes are written like this.²
- The `quotation` environment is redefined so that it 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 L^AT_EX 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.

² The `memoir` class has a number of commands that make it easy to change the appearance 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 $\langle width \rangle$ and one optional argument $\langle pos \rangle$ 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 change 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 L^AT_EX.)

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 L^AT_EX 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 $\frac{8}{13}$. The command can be used in text and math mode.

Text example: `\textbf{\nicefrac{8}{13}}` gives $\frac{8}{13}$.

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

Empty pages

`\emptypages{⟨noofpages⟩}` inserts $\langle noofpages \rangle$ 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 \wp : 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 $x_1 \langle bin.op \rangle x_2 \langle bin.op \rangle \dots \langle bin.op \rangle x_n$; the default value of the binary operator $\langle bin.op \rangle$ is $, \sqcup$.

Examples:

<code>\\$ \ntup{x}{n} \\$</code>	gives	x_1, x_2, \dots, x_n
<code>\\$ \ntup{+}{y}{m} \\$</code>	gives	$y_1 + y_2 + \dots + y_m$
<code>\\$ \ntup[,]{z}{k} \\$</code>	gives	$z_1 z_2 \dots z_k$
<code>\\$ \ntup[\cup]{A}{d} \\$</code>	gives	$A_1 \cup A_2 \cup \dots \cup A_d$

- 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. $P_n(A) \rightarrow P(A)$.)

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 \neq and \nsubseteq .

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 $\langle title \rangle$, a $\langle location \rangle$ top left, and an $\langle author \rangle$ top right on the first page; each may consist of several lines separated by `\\`. The user commands `\author{\langle author \rangle}`, `\location{\langle location \rangle}` and `\title[\langle shorttitle \rangle]{\langle title \rangle}` assign the desired values. – The default values of $\langle author \rangle$, $\langle location \rangle$ and $\langle title \rangle$ are `\today`, `Roskilde` and `\ttfamily[title]`; $\langle shorttitle \rangle$ defaults to $\langle title \rangle$.

Subsequent pages will be typeset using the pagestyle `nheadings` which has a header containing $\langle shorttitle \rangle$ 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 L^AT_EX comes with a few `babel` configuration files with (new or adjusted) translations of test strings used in IMFUFA L^AT_EX 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 L^AT_EX it marks the *only* place where hyphenation is allowed).

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