

Presentations with Beamer

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Abstract

In this article we briefly introduce the \LaTeX class `beamer` for presentation. We give some tips to build an effective presentation and we describe the main features of the class.

1 Introduction

For years, people thought that Microsoft PowerPoint[®] was the only tool to make presentations. More recently, Libre Office Impress[®] or Keynote[®] (for Mac) have been used for the same purpose.

When a presentation contains a great amount of mathematics and/or you want to keep its quality high you can use \LaTeX packages to build it.

Many \LaTeX classes have been developed over the years to write presentations. This paper focuses on the `Beamer` class, while a brief review of other classes will be made in paragraph 4.

2 Tips for a good presentation

Building a good presentation is not an easy task. Most presentations are boring, because they are too complicated, contain too many data, their organization is poor, the needs of the audience are not taken into account and perhaps the speaker reads it word by word. The result is an audience who gets lost after a few minutes.

In TANTAU *et al.* (2015) there is a good tutorial for building presentations (“Euclid’s presentation”) with some guidelines to make them effective.

When building a presentation, the author should:

- *know the room*: it is a good idea to visit it before the presentation and be aware of the technical equipment available;
- *know the audience*: the author should know how it is composed, what they already know of the topic, which are their interests and what background information they need;
- *be aware of the time constraints*.

The presentation should state clearly at the beginning the purpose of the talk. The main body should contain intermediate conclusions (if possible) and then the final conclusion of the talk.

It should be clear and concise and focus on a limited number of concepts.

Each slide should focus on one concept and be at most 12 lines long. It should be shown and explain

in one minute. The author should also schedule a question and answer moment for discussion.

Use of animations and special effects should be limited. Background should be chosen carefully, as well as colours.

A good use of images improves the quality of the presentation.

3 Presentations in Beamer

The `Beamer` class is an excellent tool for creating presentations, both for didactic and scientific purposes.

It was created in 2003 by Till Tantau for his PhD defense presentation and immediately published on CTAN. In 2010, maintenance was handed over to Joseph Wright and Vedran Miletic, who are still maintaining it. For the complete documentation of the class, please refer to TANTAU *et al.* (2015).

The class gives its best for creating presentations to be displayed using (as the class name suggests) a `beamer`, but it can also be used to create transparency slides. It provides a great number of video “effects”¹ such as transitions, boxes and other animations.

Beamer output is a `pdf` file, so it is available on all platforms with a `pdf` files viewer².

`Pdf` files produced with the `Beamer` class are interactive, so each slide can also contain buttons to navigate into the presentation and it is possible to have a bar (side, bottom or top bar) containing an index, which is always visible and have hyper-link useful to move from a part to another of the presentation.

`Beamer` is a \LaTeX class, so a presentation created with it has the same structure of all \LaTeX documents: a preamble with all other packages and users’ macros, a body divided into sections and subsections. Slides (`Beamer frames`) are inserted in each part of the body by using the corresponding environment.

`Beamer` can be used with `pdf \LaTeX` , \LaTeX + `dvips`, `X \TeX` and `Lua \LaTeX` .

As pointed out in VOSS (2012), the main features of the class are:

- possibility to create printed, projected and noted version of a presentation;

1. The author and the maintainers, in the class manual, suggest not to exceed with video “effects” and colorful backgrounds, as they distract the audience.

2. Not all `pdf` viewers can display correctly `Beamer` effects, such as transparencies.

- plurality of options to manage all aspects (colors, fonts, and so on);
- plurality of predefined layouts;
- possibility to manage very complex document structure;
- automatic creation of navigation elements.
- `handout` is used to create printed versions of the presentation (`handout`);
- `trans` is used to create transparencies;
- `article` transfers the control of the text to another class, the `article` class.

3.1 The preamble

A minimal preamble for a Beamer presentation can be as follows:

```

\documentclass{beamer}
\mode<presentation>
{\usetheme{Boadilla}
\usecolortheme{albatross}}

\usefonttheme{serif}
\usepackage[italian]{babel}
% or other language
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}

\title[Short title]{Long Title}
\date{15 August 2000}
\author {Author 1 \inst{1}
\and Author 2\inst{2}}
\institute[Politecnico di Torino]
  \inst{1}
  Department of Mathematics\
  Politecnico di Torino
  \and
  \inst{2}%
  Department of Mathematics\
  Politecnico di Torino}

\pgfdeclareimage[height=0.5cm]{logo}
{Logo file name}
\logo{\pgfuseimage{logo}}

```

This preamble shows some characteristics of the Beamer class: “modes” and “themes”.

With a unique file it is possible to obtain different outputs: the presentation to be projected, a file with the slides ready to be printed³, an article version of the presentation, a file with talk notes.

The main file can contain instructions and text which are to be used in one or more of this “modes”: in our example, instructions `\usetheme{Boadilla}` and `\usecolortheme{albatross}` are contained in the command `\mode<presentation>` thus they will be used in all *modes* except `article`, while the instruction `\usefonttheme{serif}` will be used in all versions of the presentation.

Modes in `beamer` define the purpose for which the file is created:

- `beamer` is the default mode and it is used for files to be displayed with a projector;
- `second` is used when the author needs to create material to be displayed on a second screen;

3. This file usually does not contain transition effects, it is less coloured and it often contains more than one slide per page.

The modes `all` and `presentation` are used for content to be displayed, respectively, in all modes or in all modes except of `article`.

Almost all the global aspects of the presentations are defined in a *theme*.

Beamer contains global *themes*, which define every characteristic of the layout of a presentation⁴ Beamer defines also:

- *outer themes*: they control all characteristics related to the outer layout, such as header and footer, navigation bars, logos, titles;
- *inner themes*: they control all aspects of the layout of the slide content, such as `frametitle`, `description`, `itemize` and `enumerate` environments, `theorem`, `proof`, `blocks` environment, figures and tables and so on;
- *color themes*: they control the color palette of the presentation (`\usecolortheme{albatross}` in our example);
- *font themes*: they control the characteristics of the fonts used in a presentation (in our example, `\usefonttheme{serif}`).

Beamer, as many other packages and programs for presentations, uses as a default option sans-serif fonts.

As in every LATEX document, a title and a subtitle can be printed, as well as date and authors (with the usual instructions). Please note the instruction `\inst` which allows to declare the affiliation of an author to a University, a school or a firm.

The instruction `\logo` allows to insert the institution logo or the conference one. It is declared as a `pgf`⁵ image.

3.2 The title page

A presentation usually starts with a title page, containing the title of the presentation, the authors and affiliation, the date and the conference title.

This page can be created using the `\maketitle` command alone, as an argument of the `\frame` command (or environment), or by inserting in them the `\titlepage` command:

```

\begin{frame}
\titlepage
\end{frame}

```

4. All predefined themes, both global, outer, inner, font and color, are listed in TANTAU *et al.* (2015).

5. The author of the `Beamer` class is also the author of the `pgf` package, see TANTAU (2013)

3.3 The table of contents

Beamer allows to create a table of contents by using the `\tableofcontents[options]` command. The table of contents is inserted in the frame in which the command appears.

The options allow to produce particular behaviours. The most useful ones are:

- `currentsection` makes visible only the contents of the current section and its subsections and semi-transparent the others. A similar behaviour is obtained for subsections with the option `currentsubsection`;
- `hideallsubsections` hides all subsections, while `hideothersubsections` hides all subsections except the current one;

All the options, along with their behaviour, can be found in TANTAU *et al.* (2015) and allow a very precise control of all elements of the table of contents.

3.4 The document body

The Beamer class produces a document divided in `parts`, `sections` and `subsection`. This structure is used in the index of the presentation and, if used, in the navigation bar. The structure can appear in all modes or only in a particular one. For example, the code

```
\section<beamer>{This section appears ↔
  only in the beamer mode}
\section<handout>{This section exists ↔
  only in the handout mode}
```

creates sections that appear only in the mode specified in `<...>`⁶.

Slides are created by the `\frame` command or using the `frame` environment (please note that some options are available only for the environment).

A frame always displays at least the content written in the command or environment. The other elements that can be displayed, depending on the theme, are:

- *a sidebar* for the table of contents;
- *a navigation bar* (this one is always present unless explicitly eliminated, see paragraph 3.6);
- *a bottom bar* with some information, for example author, affiliation, conference;
- *a upper bar* with the structure of the presentation, i.e. section and subsection;
- *the frame title*.

Its content can be shown all together or in different moments, maybe with effects.

For example, the following code

6. The same syntax can be used in other commands to obtain the same behaviour, for example in the list commands, see paragraph 3.4.2.

```
\begin{frame}
\transglitter<1-2>[direction=45]
your text here
\end{frame}
```

produces a slide with a glitter effect that sweeps in the specified direction⁷.

Usually, each slide has a title and sometimes also a subtitle. There are two ways to insert a title:

- by using the command `\frametitle` immediately after the header of the environment:

```
\begin{frame}
\frametitle{Your title}
your text here
\end{frame}
```

- by specifying it in the frame environment:

```
\begin{frame}[options]{title}{↔
  subtitle}
your text here
\end{frame}
```

The frame environment has many useful options. Among them

- the `allowframebreaks` option allows to split the content of a frame on more than one page (please note that this option is deprecated, as a slide should contain at most 12 lines, see section 2).
- The `allowdisplaybreak` option allows large formulae to split across slides;
- `b`, `c` and `t` manage the vertical alignment of the slide (the default is `c`);
- `fragile` allows verbatim material to be inserted in a slide;
- `shrink` allows to reduce the text by the specified percentage if it is too long for a single slide (please note that this option is deprecated, as a slide should contain at most 12 lines, see section 2).

3.4.1 Overlays

The content of each frame can be displayed all together or, more often, in different steps. What we usually want is to be able to hide and display different parts of a slide. The easiest way to do this is to use *overlays* to activate and deactivate parts of a slide.

There are several ways to achieve this purpose⁸. In the commands that require the specification of the overlays, this one must be given in the optional

7. For other transition effects, see TANTAU *et al.* (2015).

8. Here we show commands to cover or uncover content in slides. Please note that the same goal can be achieved by the environment with the same or similar name (for instance, `onlyenv` for `\only`).

argument `<...>`: you can specify a single overlay (`<3>`), many overlays (`<3,5,9>`), an interval (`<2-4>`), all overlays until one specified (`<-4>`) or starting from one specified (`<2->`).

The main commands for overlays are

- `\pause`: it is the simplest command. Beamer shows the content of a frame until the command and the other part of the slide are shown only when the slide is advanced by a click of the mouse or a key press;
- `\onslide<...>{text}`: it is a more powerful and flexible command, which shows `text` in the specified overlays;
- `\only<...>{text}<...>`: if one or both overlay specifications are given, `text` is inserted only on the specified slides and is thrown away in the other slides;
- `\uncover<...>{text}`: `text` is shown only on the specified slides. In the others, it is still typeset and it occupies space, but it is invisible. A similar behaviour can be achieved with the `\visible` and `\invisible` commands;
- `\alt<...>{default text}{alternative text}<...>`: if one (and only one) of the overlay specifications is given, `default text` is printed on the specified overlays and `alternate text` on the others;
- `\temporal<...>{before slide text}{default text}{after slide text}`: this command prints `before slide text` if the slides come before the one indicated in the overlay specification, `default text` on the slide indicated in the overlay specification and `after slide text` on the slides after the specified ones.

A detailed list of these commands is available in TANTAU *et al.* (2015) and many examples can be found in VOSS (2012).

Beamer treats the text that is not shown in an overlay in two ways: as invisible text, which occupies space and can have transparency effects, or as text to be inserted only in the specified overlays, while in the other it is somehow “thrown away”. For instance, the command `\only` behaves in the second way, while the command `\onslide` usually behaves in the first way.

In Beamer many LATEX commands and environment (such as `theorem`) accept as an optional command the specification of the slides in `<...>`.

In this example

```

\begin{frame}
\textbf{bold line in all overlays}
\textbf<2>{bold line only on the second overlay}
\textbf<3>{bold line only in the third overlay}
\end{frame}

```

the option in `<...>` specifies on which overlays the `\textbf` command should be used.

In this example

```

\begin{frame}
\begin{theorem}<1->[Lagrange]
  text of the theorem
\end{theorem}
\begin{proof}<2->
  proof of the theorem
\end{proof}
\end{frame}

```

the text of the theorem appears in all overlays, while the proof appears only from the second.

3.4.2 Lists

In Beamer you can (obviously) use the usual list environments of LATEX. These environments have a slightly different syntax which allows to specify the behaviour of each element in a particular overlay.

It is possible to specify the overlays in which an item should be displayed with the option `<...>` in the command `\item` or specify that items are to be displayed one by one with the option `<+>` in the `itemize`, `enumerate` or `description` environments:

```

\begin{itemize}[<+>]
\item This item appears from the first overlay.
\item This item appears from the second overlay.
\item<1-> This item appears in the first overlay, as it is specified in the option of the item itself.
\item This item appears from the third overlay.
\end{itemize}

```

3.4.3 Highlighting of text

Beamer has different commands or environments to highlight parts of the text.

The two most useful commands are `\alert<...>{text}`, which highlights `text` by changing (usually) its color (by default in red) and `\structure<...>{text}`, which marks `text` as a part of the structure, which highlights the text in the same colour and font of other structural elements of the presentation (slide titles, navigation bar, etc.).

Both commands can be used in an entire environment, such as `itemize` or `enumerate`, as the following example shows (we suppose that the colour of the text is black and the color of the alerted text is red):

```

\begin{itemize}[<+>| alert@+]
\item This item appears in the first overlay colored in red.
\item This item appears in the second overlay colored in red, while the first one becomes black.
\item This item appears in the third overlay colored in red, while the first and second ones become black.
\end{itemize}

```

Example title of slide

Bold text
Italic text
 Magenta text
 Text highlighted with the command `alert`
 Text highlighted with the command `structure`

FIGURE 1: The second slide of the presentation with the default structure colour

In this example, all items appear on the second overlay, but are highlighted one after the other:

```
\begin{itemize}
\item<2->\alert<2> Item 1 appears on the↵
  second overlay, in red.
\item<2->\alert<3> Item 2 appears on the↵
  second overlay, and it is red on ↵
  the third one.
\item<2->\alert<4> Item 3 appears on the↵
  second overlay, and it is red on ↵
  the fourth one.
\end{itemize}
```

To better understand the difference between the two commands, you can see the following example. The code

```
\documentclass{beamer}

\usepackage[utf8]{inputenc}

\begin{document}

\begin{frame}

\textbf<2>{Bold text}

\textit<2>{Italic text}

\textcolor<2>{magenta}{Magenta text}

\alert<2>{Text highlighted with the ↵
  command \texttt{alert}}

\structure<2>{Text highlighted with the ↵
  command \texttt{structure}}

\end{frame}

\end{document}
```

produces a beamer presentation, the second slide of which is shown in figure 1.

You can see different types of highlighting. Please notice that the `\structure` command highlights the text in the same colour of the frame title and the navigation bar (the elements of the structure).

If you change the structure colour, frame title, navigation bar and argument of the `\structure` command change accordingly, as shown in figure 2.

Example title of slide

Bold text
Italic text
 Magenta text
 Text highlighted with the command `alert`
 Text highlighted with the command `structure`

FIGURE 2: The second slide of the presentation with the changed structure colour

3.4.4 Boxes

Another way to highlight parts of the presentation is by using coloured boxes. Some environments, such as theorem, definition, example, build around the text a coloured box (by default, the first and the second use the `structure` colour, the third one uses green). It is possible to create also different boxes:

```
\begin{block}<overlays>
{header}
  text
\end{block}
\begin{alertblock}<overlays>
{header}
  text highlighted in the alert colour
\end{alertblock}
```

It is also possible to define boxes with the desired colours or for desired purposes (for example, boxes for exercises), using the environments `beamercolorbox` and `beamerboxesrounded`:

```
\setbeamercolor{postit}{fg=black,bg=↵
  yellow}
\begin{beamercolorbox}[sep=1em,wd=5cm]{↵
  postit}
  text
\end{beamercolorbox}

\setbeamercolor{uppercol}{fg=white,bg=↵
  green}
\setbeamercolor{lowercol}{fg=black,bg=↵
  green}
\begin{beamerboxesrounded}[upper=↵
  uppercol,lower=lowercol,shadow=true↵
  ]{Theorem}
$A = B$.
\end{beamerboxesrounded}
```

3.4.5 Verbatim mode

Verbatim material in beamer needs a special treatment. A slide which contains verbatim must be declared with the option `fragile`. This option tells that the verbatim code must be written on an external file which will be read back in order to treat the material correctly:

```
\begin{frame}[fragile]
verbatim text
```

```
\end{frame}
```

Another way to insert verbatim text in a frame is to use the `semiverbatim` environment:

```
\begin{frame}
\begin{semiverbatim}
verbatim text
\end{semiverbatim}
\end{frame}
```

3.4.6 Figures

Figures can be included in a beamer presentation in two ways:

- with the usual command `\includegraphics`, which has (as almost all commands in beamer) an extended syntax:

```
\includegraphics<overlays>[<←
settings>]{file name}
```

which allows to specify also the overlays in which the image must appear;

- with the couple of commands (from the `pgf` package) `\pgfdeclareimage` and `\pgfuseimage`:

```
\pgfdeclareimage[settings]{beamer <←
name>}{file name}
\pgfuseimage[settings]{beamer name<←
}
```

In this case, the overlays in which the image must appear are set with one of the commands seen in paragraph 3.4.1.

This is an example of the two commands in a slide:

```
\begin{frame}
\includegraphics<1->{image1}%%% this <←
image appears on all overlays
\includegraphics<2->{image2}%%% this <←
image appears from the second <←
overlay
\end{frame}
\pgfdeclareimage[scale=0.5]{image3}{<←
images/image3}
\pgfdeclareimage[scale=0.7]{image4}{<←
images/image4}
\uncover<3->{\pgfuseimage{image3}}%%% <←
this image appears from the third <←
overlay
\only<4>{\pgfuseimage{image4}}%%% this<←
image appears only on the fourth <←
overlay
```

3.4.7 Time settings

Beamer offers the possibility to set the duration of each overlay. This purpose can be achieved with the command `\transduration`:

```
\transduration<overlay specification>{<←
number of seconds}
```

For instance, the code

```
\transduration<1>{10}
```

sets the duration of the first overlay to 10 seconds, then the overlay is changed to the second.

3.4.8 Sounds and animations

A very interesting possibility offered by beamer is to magnify parts of a very complicated slide or very big figure (zoom effect) with the command `\framezoom`:

```
\framezoom<button overlay specification <←
><zoomed overlay specification>{<←
options}
(upper left x,upper left y)(zoom area <←
width,zoom area depth)
```

For example, the code, taken from TANTAU *et al.* (2015)

```
\begin{frame}
\frametitle{A Complicated Picture}
\framezoom<1><2>(0cm,0cm)(2cm,1.5cm)
\framezoom<1><3>(1cm,3cm)(2cm,1.5cm)
\framezoom<1><4>(3cm,2cm)(3cm,2cm)
\pgfimage[height=8cm]{<←
complicatedimagefilename}
\end{frame}
```

produces three zooming areas for the big picture, each one in a different position and to be displayed on different overlays, starting from the second.

It is also possible to insert into the presentation multimedial files, both audio and video. Please note that the files will not be inserted in the `pdf` file, which contains only a link to the audio or video file. Thus it is necessary to have multimedial files with the presentation in order to display them. Depending on the PC configuration, the file will be displayed into the presentation or in an external viewer. Audio files can be loaded into the presentation with the command

```
\sound[options]{sound poster text}{sound <←
filename}
```

and videos can be loaded with the command

```
\movie[options]{poster text}{movie <←
filename}
```

from the multimedia package.

The command

```
\animate<overlay specification>
```

allows to create animations by showing overlays in rapid succession.

Settings of the animation can be modified with the command

```
\animatevalue<start slide-end slide> {<←
name}{start value}{end value}
```

For example, if you create a sequence of pictures with name `animate1`, `animate2`, ..., `animate10`, the following code, taken from TANTAU *et al.* (2015)

```
\begin{frame}
\animate<2-9>
\multiinclude[start=1]{animate}
\end{frame}
```

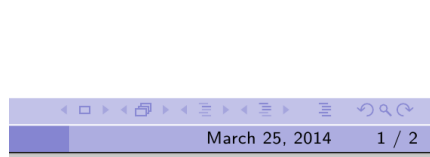


FIGURE 3: Beamer navigation bar

allows the creation of a simple animation by displaying the images in rapid sequence. The command `\multiinclude` allows to load all images with name `animate` followed by a number.

For a more detailed description of the use of animations in `beamer`, see PIGNALBERI (2010).

3.5 Fonts

In `beamer`, fonts are managed through *themes*, as described in paragraph 3.1.

The command `\usefonttheme{default}` loads a sans serif font for all the presentation. Some character glyphs in mathematical text are replaced by more appropriate versions automatically. This produces a text with glyphs from two different collections, which gives sometimes strange results.

Claudio Beccari has created the `lxfonts` package to overcome the problems of the standard font used for slides. The package and its usage are fully described in BECCARI (2007) and in BECCARI (2013).

To use this fonts in `beamer` it is necessary to change the font theme from default to professional:

```
\usefonttheme{professionalfonts}
```

This command tells `beamer` not to make any substitution, as it is managed by the font package.

The package is then loaded by the usual command

```
\usepackage{lxfonts}
```

Please note that the package should be loaded after having loaded all the other fonts packages.

A demo of the results of the package is contained in the documentation, see BECCARI (2013).

3.6 Navigation bar

The majority of `beamer` templates has a *navigation bar* in the bottom right corner of each slide, as shown in figure 3.

The symbols, from left to right, are:

- the *overlay* icon, a single rectangle with forward and backward arrows to navigate from an overlay to the others of each slide;
- the *slide* icon (or *frame* icon), a set of rectangles with forward and backward arrows;
- a *subsection* icon, a highlighted line in a symbolic table of contents, with forward and backward arrows;

- the *section* icon, a highlighted line with smaller lines below for subsections, with forward and backward arrows;
- the *presentation* icon, a highlighted symbolic table of contents;
- the *search* icon, a magnifying glass with forward and backward arrows.

If these symbols are not needed, they can be disabled with the code

```
\setbeamertemplate{navigation symbols}{}
```

If other symbols are needed, they can be added with the command `\insert` with the name of the symbol attached. For example

```
\insertframenavigationsymbol
```

allows to add the icon to navigate slides backward and forward.

3.7 Multi-column layout

When building a presentation, it may be useful to put the content of a slide on more than one column. For instance, this layout can be useful to insert into the slide a figure and its explanation on the right side.

The code for building a multi-column layout is the following

```
\begin{columns}[settings]
\begin{column}[position]{width}
  content of first column
\end{column}
\begin{column}[position]{width}
  content of second column
\end{column}
...
\end{columns}
```

This syntax makes all columns appear on the first overlay of the slide. If you need to make them appear one by one, you can use the commands described in paragraph 3.4.1, for instance `\only`.

3.8 Advanced personalization: new commands and environments

`Beamer` offers a wide number of ways to personalize a presentation: it has commands for modifying the layout, the theme, and so on.

Over the internet, you can find a lot of personalized templates, you should only search for “`beamer templates`” on every search engine.

If you want to create your personalized theme, you can find a good introduction to personalization in FIANDRINO (2014).

Here we want to show how to create (or redefine) commands or environment in `beamer` in order to make them aware of overlays. We have seen all along the paper that a lot of commands are redefined to be visible in some overlays and invisible in other (see paragraph 3.4.1 for some examples).

When defining or redefining a command or environment, you can specify in the definition that it can have a different behaviour on different overlays:

```

\newcommand<>{command name}[argument ←
  number][default value]{text}
\renewcommand<>{existing command name←
  }[argument number][default value]{←
  text}
\newenvironment<>{environment name}[←
  argument number][default value]{←
  begin text}{end text}
\renewenvironment<>{existing ←
  environment name}[argument number←
  ][default value]{begin text}{end ←
  text}

```

The difference with the standard similar commands of L^AT_EX is that here the number of parameters accepted is equal to argument number plus one, being the latter the overlay specification for the command or the environment to operate.

For instance, the code

```

\newcommand<>{\makemegreen}[1]{\color←
  #2{green}#1}

```

produces a text which is coloured in green on the specified overlays and in the normal colour on the others.

Other examples can be found in TANTAU *et al.* (2015).

4 Other classes to write presentations

We have shown the main features of the beamer class to build presentations, as it is a widely used tool for this purpose.

There are nevertheless many other classes that can be used. Among the others, we note

- **overlays**: it allows to write presentations with incremental slides;
- **gridslides**: it allows to create free form slides with blocks placed on a grid. The blocks can be filled with text, equations, figures and so on;
- **texpower**: it is a bundle of packages that provide an environment for creating pdf screen presentations;
- **ffslides**: it is a small set of macros added to the article class, with the aim to easily design documents such as presentations, posters, research or lecture notes, and so on;

- **ifmslide**: it is used to produce printed slides with L^AT_EX and online presentations with pdfL^AT_EX;

- **powerdot**: it is a presentation class for L^AT_EX that allows for the quick and easy development of professional presentations;

- other classes or packages: lecturer, pdfslide, talk, prosper, fancyslides, elpres, ppower4.

Powerdot is well described in VOSS (2012); a wide range of examples are available in <https://www.ctan.org/pkg/presentations-en>.

References

BECCARI, Claudio (2007). «I font per le slide L^AT_EX resuscitati». *ArsTeXnica*, (4), pp. 82–87. <http://www.guitex.org/home/numero-4>.

— (2013). «Lxfonts – set of slide fonts based on cm». CTAN:fonts/lxfonts.

FIANDRINO, Claudio (2014). «Introduzione alla personalizzazione di beamer». <http://www.guitex.org/home/images/doc/GuideGuIT/intropersbeamer.pdf>.

PIGNALBERI, Gianluca (2010). «Presentazioni animate in L^AT_EX». *ArsTeXnica*, (10), pp. 33–40. <http://www.guitex.org/home/numero-10>.

TANTAU, Till (2013). «The TikZ and PGF Packages». <http://sourceforge.net/projects/pgf>.

TANTAU, Till, Joseph WRIGHT and Vedran MILETIĆ (2015). «The beamer class». CTAN:macros/latex/contrib/beamer/doc/beameruserguide.pdf.

VOSS, Herbert (2012). *Presentations with L^AT_EX*. Lehmanns media, Berlin, 1st edition.

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