

A Beamer Quickstart

Table of Contents

<u>A Beamer Quickstart</u>	1
<u>Contents</u>	2
<u>1 Prologue</u>	4
<u>How to read this Quickstart</u>	4
<u>Acknowledgment</u>	4
<u>2 What is new</u>	6
<u>3 A bare-bones sample</u>	7
<u>4 Compiling into pdf</u>	9
<u>5 A complete presentation</u>	10
<u>6 Themes</u>	12
<u>Standard Beamer themes</u>	13
<u>Inner and outer themes, etc.</u>	14
<u>7 Customizing themes</u>	15
<u>7.1 The structure color</u>	15
<u>7.2 Specifying RGB colors</u>	16
<u>7.3 Direct use of the structure color</u>	17
<u>7.4 Changing the itemization markers</u>	17
<u>7.5 Rounded boxes and shadows</u>	18
<u>7.6 Getting rid of the navigation icons</u>	19
<u>7.7 Adding an informative footline</u>	20
<u>8 UMBC themes</u>	23
<u>The umbc1 theme</u>	23
<u>The umbc2 theme</u>	23
<u>The umbc3 theme</u>	24
<u>The umbc4 theme</u>	25
<u>Customizing the umbc themes</u>	25
<u>9 The UMBC footline</u>	27
<u>Redefining the footline</u>	28
<u>Dynamic footlines</u>	28
<u>10 The UMBC tribullet markers</u>	29
<u>11 UMBC boxes</u>	31
<u>12 The title page</u>	34
<u>Titlepage elements</u>	35
<u>About the [plain] qualifier</u>	36

Table of Contents

<u>13 Including graphics</u>	37
<u>Converting graphics</u>	37
<u>eps to pdf</u>	38
<u>All other conversions</u>	38
<u>14 Overlays</u>	39
<u>15 Navigating with hyperlinks</u>	41
<u>Returning to the calling page</u>	42
<u>16 Theorems and such</u>	44
<u>17 Splitting a slide into columns</u>	47
<u>Vertical alignment</u>	48
<u>Vertical alignment with images</u>	49
<u>18 Vertical alignment within slides</u>	53
<u>Vertical alignment in individual slides</u>	53
<u>Vertical alignment for the entire document</u>	55
<u>19 The default font size</u>	56
<u>20 The default text color</u>	57
<u>21 The structure font and font themes</u>	58
<u>Font themes</u>	61
<u>22 Shrinking to make things fit</u>	64
<u>23 Changing margin widths</u>	65
<u>24 All about colors</u>	66
<u>Named colors from the dvips package</u>	66
<u>Named colors from the SVG package</u>	67
<u>Blending colors</u>	69
<u>Defining your own colors</u>	69
<u>25 Colored text, highlights and boxes</u>	71
<u>26 Setting a slide's background</u>	73
<u>Setting the background to a solid color</u>	73
<u>Gradient colors in the background</u>	74
<u>Grid superimposed on background</u>	74
<u>An image for a background</u>	75
<u>27 Acrobat Reader usage</u>	78
<u>Acrobat Reader usage under Linux</u>	78
<u>Acrobat Reader usage on other systems</u>	78

Table of Contents

28 Xpdf usage.....	79
Running Xpdf inside a window.....	79
Running Xpdf in the full-screen mode.....	80
Advanced usage.....	80
Where to get Xpdf.....	80
29 Beamer on the Web.....	82
Beamer's home on the web.....	82
Screenshots.....	82
A very brief introduction.....	82
Advanced tutorials.....	82
30 A gallery of Beamer slides.....	83
31 Complete set of Beamer themes.....	95
Beamer theme AnnArbor.....	95
Beamer theme Antibes.....	95
Beamer theme Bergen.....	96
Beamer theme Berkeley.....	96
Beamer theme Berlin.....	96
Beamer theme Boadilla.....	96
Beamer theme CambridgeUS.....	97
Beamer theme Copenhagen.....	97
Beamer theme Darmstadt.....	97
Beamer theme Dresden.....	97
Beamer theme Frankfurt.....	98
Beamer theme Goettingen.....	98
Beamer theme Hannover.....	98
Beamer theme Ilmenau.....	98
Beamer theme JuanLesPins.....	99
Beamer theme Luebeck.....	99
Beamer theme Madrid.....	99
Beamer theme Malmoe.....	99
Beamer theme Marburg.....	100
Beamer theme Montpellier.....	100
Beamer theme PaloAlto.....	100
Beamer theme Pittsburgh.....	100
Beamer theme Rochester.....	101
Beamer theme Singapore.....	101
Beamer theme Szeged.....	101
Beamer theme Warsaw.....	101
Beamer theme boxes.....	102
Beamer theme default.....	102
Index.....	103

A Beamer Quickstart

Rouben Rostamian

December 2004

Contents

Prologue

[1 Prologue](#)

[2 What is new](#)

Getting started

[3 A bare-bones sample](#)

[4 Compiling into pdf](#)

[5 A complete presentation](#)

Themes

[6 Themes](#)

[7 Customizing themes](#)

[7.1 The *structure* color](#)

[7.2 Specifying RGB colors](#)

[7.3 Direct use of the structure color](#)

[7.4 Changing the itemization markers](#)

[7.5 Rounded boxes and shadows](#)

[7.6 Getting rid of the navigation icons](#)

[7.7 Adding an informative footline](#)

[8 UMBC themes](#)

[9 The UMBC footline](#)

[10 The UMBC tribullet markers](#)

[11 UMBC boxes](#)

Bits and Pieces

[12 The title page](#)

[13 Including graphics](#)

[14 Overlays](#)

[15 Navigating with hyperlinks](#)

[16 Theorems and such](#)

[17 Splitting a slide into columns](#)

[18 Vertical alignment within slides](#)

[19 The default font size](#)

[20 The default text color](#)

[21 The structure font and font themes](#)

[22 Shrinking to make things fit](#)

[23 Changing margin widths](#)

[24 All about colors](#)

[25 Colored text, highlights and boxes](#)

[26 Setting a slide's background](#)

Epilogue

[27 Acrobat Reader usage](#)

[28 Xpdf usage](#)

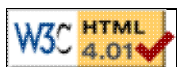
[29 Beamer on the Web](#)

Gallery

[30 A gallery of Beamer slides](#)

[31 Complete set of Beamer themes](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)



[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

1 Prologue

Beamer is a LaTeX documentclass for producing slides. The default output is a pdf file which is suitable for on-screen viewing.

The aim of this document is to get you started quickly with Beamer. It gives you enough of the basics to let you begin using Beamer in a productive way. I have avoided calling this a "Tutorial" because a tutorial implies a certain thoroughness which this limited presentation lacks.

Beamer's manual is over 200 printed pages. When you feel the need to go beyond the basics, you should consider reading the manual. There is more to Beamer than what appears here.

These pages were created in December 2004. The information herein is based on version 3.01 of Beamer. See [Beamer on the Web](#) for references and web resources.

The [Gallery](#) page shows a sampler of slides produced by Beamer.

I have written this *Quickstart* primarily for the use of graduate students in the [Department of Mathematics and Statistics](#) at [UMBC](#). I have assumed throughout, without elaboration, that the underlying operating system is Linux or something unix-like, because that's what we have in the department.

I have also assumed throughout that you know the ins and outs of LaTeX; this is certainly *not* a LaTeX tutorial.

LaTeX and Beamer are platform-independent, therefore examples and advice given here should carry over to other platforms, in principle. The specifics of compilation and execution may vary; you will have to consult with your local *TeXnician* if you need help with these.

How to read this *Quickstart*

If you are completely new to Beamer, I suggest that you begin at the beginning, that is, at [A bare-bones sample](#). Examine the file *small.tex* presented there to get a feel about Beamer's syntax. Then read the subsequent section where you are told how to compile a Beamer source file into pdf.

Then download *small.tex* and compile and view the result. Verify that what you see corresponds to what I have shown in [A bare-bones sample](#).

Then begin experimenting with *small.tex* to see if you can create slides the way you want them. If there are things that you feel you should be able to do but you don't know how, then look through the *Table of Contents* or the *Index*. Chances are that you will find there what you are looking for.

Acknowledgment

The document you are reading was written in LaTeX then converted to HTML using Dorai Sitaram's [TeX2page](#) utility.

A Beamer Quickstart

I have modified TeX2page in certain places to suit my needs. My apologies to Dorai Sitaram for having abused/misused his program.

Rouben Rostamian

Department of Mathematics and Statistics

University of Maryland, Baltimore County

Baltimore, MD 21250, USA

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

2 What is new

In this section I will attempt to maintain a history of changes to this website.

2005-03-06

Added new theme, *umbc3*. Inserted samples in [UMBC themes](#) and [Gallery](#). Updated [beamer-umbc.tgz](#) accordingly.

2005-11-03

Added reference to Norm Matloff's site in [Beamer on the Web](#).

2006-05-13

Changed "background" to "background canvas" in section [An image for a background](#).

2007-05-05

Added section [Complete set of Beamer themes](#).

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

3 A bare-bones sample

The basic structure of a Beamer input file is pretty simple. Consider the file [small.tex](#), the content of which is shown below:

```
% small.tex
\documentclass{beamer}
\usetheme{default}
\begin{document}

\begin{frame}
  \frametitle{A sample slide}

  A displayed formula:

  \[
    \int_{-\infty}^{\infty} e^{-x^2} \, dx = \sqrt{\pi}
  \]

  An itemized list:

  \begin{itemize}
    \item itemized item 1
    \item itemized item 2
    \item itemized item 3
  \end{itemize}

  \begin{theorem}
    In a right triangle, the square of hypotenuse equals
    the sum of squares of two other sides.
  \end{theorem}

\end{frame}

\end{document}
```

The input file above produces the following slide:

A sample slide

A displayed formula:

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$$

An itemized list:

- ▶ itemized item 1
- ▶ itemized item 2
- ▶ itemized item 3

Theorem

In a right triangle, the square of hypotenuse equals the sum of squares of two other sides.



Remark: In Beamer, a *frame* is what you would normally call a "slide". The image shown above is the realization of a single "frame". In what follows, I use the terms "frame" and "slide" interchangeably.¹

The `\begin{frame}...\end{frame}` block may be repeated any number of times to produce a sequence of slides.

Remark: The `\frametitle{...}` command puts a title on the slide. Although its use is optional, it is only in very rare cases where omitting a slide title would make sense.

¹ In Beamer, a "slide" and a "frame" are technical terms with distinct meanings. However it is of no profit to the casual user to fret over the distinction.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

4 Compiling into pdf

To compile the previous section's LaTeX source file, *small.tex*, into a pdf file for on-screen viewing, do:

```
pdflatex small.tex
```

This will run the source file *small.tex* through *pdflatex* and, if all's well, produce a file named *small.pdf*.

The resulting file may be viewed with a pdf viewer. The most common pdf viewer is Adobe's Acrobat Reader which is available for free for use on essentially any computer platform.

An alternative is Glyph & Cog, LLC's Xpdf which runs under the X Window System on unix, vms, and os/2.

See [Acrobat Reader usage](#) and [Xpdf usage](#) pages for usage tips for these viewers.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

5 A complete presentation

The file *hfc.tgz* contains the source of slides for an hour-long talk that I gave in the department some time ago. You may find it useful as an example of a real-life Beamer presentation.

Download the compressed archive *hfc.tgz* and unpack it. On unix-like systems you will probably unpack the archive by executing the command:

```
tar xfz hfc.tgz
```

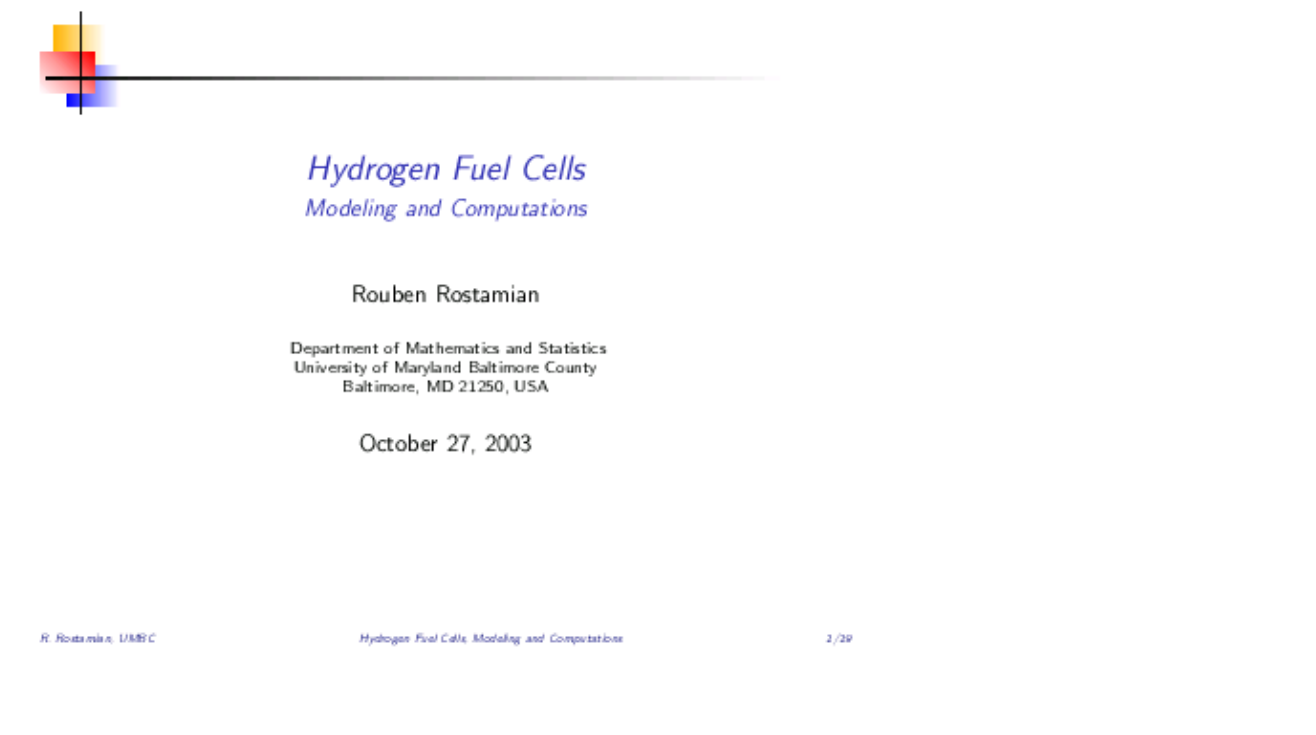
This will expand the archive into a directory named *hfc*.² That directory will contain about 20 files, most being images, and one Beamer source file named *hfc.tex*.

To compile, change to the *hfc* directory, then do:

```
pdflatex hfc.tex  
pdflatex hfc.tex
```

This will create the presentation file *hfc.pdf*.

Two passes of `pdflatex` are needed to let LaTeX determine the presentation's total page count, otherwise page numbers in footlines may be wrong.



² After expanding the archive, the file *hfc.tgz* is no more needed. You may remove it, `rm hfc.tgz`, to save disk space.

6 Themes

The overall appearance of a Beamer slide may be altered drastically by applying a Beamer *theme* to the slide.

To illustrate the effects of various themes, I will use the file `sample.tex` which is a slightly modified version of the previous `small.tex`.

Here is what the preamble of `sample.tex` and the resulting slide look like:

```
\documentclass{beamer}
\usetheme{default}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any
function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |



The line `\usetheme{default}` loads Beamer's *default* theme. If we replace that line with:
`\usetheme{Boadilla}`, we will obtain the *Boadilla* theme which looks like this:

```
\documentclass{beamer}
\usetheme{Boadilla}
```


A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |



Compare this with the previous slide and note the drastic changes, including the added frame around the theorem, the 3D rounded markers for itemized and enumerated lists, and the footline that includes date and slide number, among other things.

Standard Beamer themes

Beamer comes with a large selection of themes. Themes are named after various cities, such as *Boadilla*, *Madrid*, *Copenhagen*, and *Singapore*, where Beamer's author and his collaborators have given Beamer presentations.

In UMBC's Department of Mathematics and Statistics computer network, the Beamer themes are located in the directory:

```
/usr/local/share/texmf/tex/latex/beamer/themes/theme/
```

In my opinion, the following themes are more interesting than others. I have provided sample images in the [Gallery](#). You can find a complete set of images of *all* Beamer themes in Jason Gorski's page referenced in [Beamer on the Web](#).

- default
- Boadilla
- Madrid
- Pittsburgh
- Rochester [works best as `\usetheme[height=7mm]{Rochester}`]
- Copenhagen
- Warsaw
- Singapore
- Malmoe

Experiment to see which one is more to your liking.

Inner and outer themes, etc.

Beamer themes which are named after cities, such as *Boadilla* and *Pittsburgh*, are *complete themes* in the sense that they control just about every aspect of a slide's appearance. Think of this as *major themes*. These themes are invoked with the `\usetheme` command, as in `\usetheme{Pittsburgh}`.

Beamer also provides what may be thought of as *minor themes*. These control somewhat narrowly defined aspects of a slide's appearance. You may invoke one or more of these minor themes in conjunction with a major theme to alter/modify the major theme's characteristics.

Beamer's "minor themes" fall into 4 categories:

outer themes

control a slide's decorations, such as text and graphics that appear in a slide's header and footer sections. For example, `\useoutertheme{shadow}` adds a 3-D shadow to some header elements.

See [Adding an informative footline](#) and [The UMBC footline](#) for examples of `\useoutertheme`.

inner themes

control a slide's inner area, such as markers/bullets for itemization lists and boxes placed around theorems. For example, `\useinnertheme{rounded}` gives a rounded and 3-D look to theorem-containing boxes and itemization markers.

See [The UMBC tribullet markers](#) and [UMBC boxes](#) for examples of `\useinnertheme`.

font themes

control font shapes and sizes of various elements of a slide show. For example, `\usefonttheme{serif}` changes the document's fonts to serif. (The default is sans-serif.)

See [The structure font and font themes](#) for examples of `\usefonttheme`.

color themes

control the colors of title, frametitle, itemization bullets, and many other elements of a slide show. For example, `\usecolorheme{albatross}` changes the Beamer's default colors in quite a drastic way.

See [The structure color](#) and [Specifying RGB colors](#) for examples of `\usecolorheme`.

On department's machines, you will find the style files corresponding to Beamer's themes in the directories:

```
/usr/local/share/texmf/tex/latex/beamer/themes/theme/ % the major themes
/usr/local/share/texmf/tex/latex/beamer/themes/inner/ % inner themes
/usr/local/share/texmf/tex/latex/beamer/themes/outer/ % outer themes
/usr/local/share/texmf/tex/latex/beamer/themes/color/ % color themes
/usr/local/share/texmf/tex/latex/beamer/themes/font/ % font themes
```

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

7 Customizing themes

There are a great number of ways in which you can fine-tune the general appearance of a Beamer theme. Here I will describe a few ideas which you may find useful.

Throughout this section, I use the Beamer theme *Rochester*. You may apply these ideas to any other Beamer theme.

I will start with the plain *Rochester* theme, and gradually add various options to show their cumulative effect. You don't have to use all the options at once. Pick the ones that suit your needs.

Remark: The option `[height=7mm]` (see samples below) specifies the thickness of the horizontal stripe that runs along a *Rochester* slide's top edge. **Please note that this option is specific to Rochester. It does not apply to other themes.**

7.1 The *structure* color

Most colored parts of a Beamer slide are drawn in an abstract color named **the structure**. You can change the overall color of a Beamer presentation by changing the structure.

The default structure in the *Rochester* theme corresponds to a certain shade of blue as you can see here:

```
\documentclass{beamer}
\usetheme[height=7mm]{Rochester}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ■ itemized item 1 | 1 enumerated item 1 |
| ■ itemized item 2 | 2 enumerated item 2 |
| ■ itemized item 3 | 3 enumerated item 3 |

Navigation icons: back, forward, search, etc.

Let's change *Rochester*'s structure to Brown:

A Beamer Quickstart

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Brown]{structure}
\usetheme[height=7mm]{Rochester}
```

The slide changes to:

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ■ itemized item 1 | 1 enumerated item 1 |
| ■ itemized item 2 | 2 enumerated item 2 |
| ■ itemized item 3 | 3 enumerated item 3 |



Remark: Note how the structure affects many items, including bullets and navigation icons.

Remark: The color "Brown" is one of a large number of color names defined in the file:

```
/usr/share/texmf/tex/latex/graphics/dvipsnam.def
```

The `xcolor=dvipsnames` option to `\documentclass` brings these color names into Beamer. See [All about colors](#) for details.

Experiment with various colors to find one that fits best with your style.

7.2 Specifying RGB colors

Should you find the set of colors defined in *dvipsnam.def* too limited, you may define your own colors by specifying their RGB components. Each RGB component should be in the 0-255 range.

For instance, with `RGB={205,173,0}` we get a dark shade of gold:

```
\documentclass{beamer}
\usecolortheme[RGB={205,173,0}]{structure}
\usetheme[height=7mm]{Rochester}
```

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H^1_0(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

- itemized item 1
- itemized item 2
- itemized item 3

- 1 enumerated item 1
- 2 enumerated item 2
- 3 enumerated item 3

Remark: RGB components may be given either as integers in the 0-255 range or as fractional numbers in the 0.00-1.00 range. To specify the latter, use the *lowercase* version of the `rgb` option, as in:
`rgb={0.2264,0.1561,0.0000}.`

A more interesting dynamic effect is achieved by using the command `\structure{a colored text}`. The given text will be colored according to the *structure color*. When you change the structure color, say from blue to gold, the text's color will change accordingly.

See the section [A complete presentation](#) for a sample presentation in which I use the `\structure{...}` command to produce colored text in several places.

7.4 Changing the itemization markers

The *Rochester* theme uses square markers for itemized and enumerated lists. The command `\setbeamertemplate{items}[ball]` changes the markers to simulated 3-dimensional balls, as shown the the following code and the corresponding output:

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Plum]{structure}
\settheme[height=7mm]{Rochester}
\setbeamertemplate{items}[ball]
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any
function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- itemized item 1
 - itemized item 2
 - itemized item 3
- ① enumerated item 1
 - ② enumerated item 2
 - ③ enumerated item 3



Possible options to `\setbeamertemplate{items}` are:

ball:

3-dimensional balls

circle:

2-dimensional (flat) circles

rectangle:

rectangles

default:

triangles

7.5 Rounded boxes and shadows

To add rounded corners and a shadow to the box that surrounds the theorem in the sample slides shown above, do:

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=OliveGreen]{structure}
\settheme[height=7mm]{Rochester}
\setbeamertemplate{items}[ball]
\setbeamertemplate{blocks}[rounded][shadow=true]
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |



To get rounded corners but no shadows, set `[shadow=false]`.

7.6 Getting rid of the navigation icons

Most Beamer themes put a row of navigation icons on slides. (See the little marks along the bottom edge of the slide shown above.) I consider these pretty useless and distracting. To disable the drawing of navigation icons, add the command: `\setbeamertemplate{navigation symbols}{} to your document, as in:`

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Apricot]{structure}
\usetheme[height=7mm]{Rochester}
\setbeamertemplate{items}[ball]
\setbeamertemplate{blocks}[rounded][shadow=true]
\setbeamertemplate{navigation symbols}{}

```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |

OK, good, they are gone!

7.7 Adding an informative footline

A *footline* is a narrow strip along the bottom edge of a slide that shows the name of the author, the title of the presentation, slide number, and other useful information.

Beamer themes *Boadilla* and *Madrid* provide such a footline by default. Other themes don't. However it is possible to add a footline to any theme by using the `\useoutertheme{infolines}` command, as in:

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Apricot]{structure}
\useoutertheme{infolines}
\usetheme[height=7mm]{Rochester}
\setbeamertemplate{items}[ball]
\setbeamertemplate{blocks}[rounded][shadow=true]
\setbeamertemplate{navigationsymbols}{}
\author{Rouben Rostamian}
\title{Beamer tutorial}
\institute{UMBC}
```


A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |

Rouben Rostamian (UMBC)

Beamer tutorial

January 5, 2005 1 / 1

Remark: It is a Beamer idiosyncrasy (a polite way of saying a *bug*) that `\useoutertheme{infolines}` must come *before* `\usetheme[height=7mm]{Rochester}`. If you reverse the order, the slide's title will be cut off.

Remark: Most of the footline information is culled from the data provided in the preamble, such as `\author`, `\title`, etc.

I have written an alternative footline theme called *umbcfootline*. You will find the details of *umbcfootline* in [The UMBC footline](#). Here is what it looks like:

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Apricot]{structure}
\usetheme[height=7mm]{Rochester}
\setbeamertemplate{items}[ball]
\setbeamertemplate{blocks}[rounded][shadow=true]
%\setbeamertemplate{navigationsymbols}{} % see Remark below
\useoutertheme{umbcfootline}
\author{Rouben Rostamian}
\title{Beamer tutorial}
\institute{UMBC}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |

Remark: The `umcfootline` theme disables the navigation symbols, therefore the `\setbeamertemplate{navigation symbols}\{\}` is no more needed. That's why I have commented it out in the shown code fragment.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

8 UMBC themes

I have created four themes which you may use just like any other Beamer theme.³ These are named: *umbc1*, *umbc2*, *umbc3* and *umbc4*.

The umbc1 theme

```
\documentclass{beamer}
\usetheme{umbc1}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

The umbc2 theme

This is a slight variation on Beamer 3.01's *Singapore* theme or Beamer 2.21's *Classic* theme.

```
\documentclass{beamer}
\usetheme{umbc2}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |

The umbc3 theme

This is inspired by a *PowerPoint* theme.

```
\documentclass{beamer}
\usetheme{umbc3}
```



A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |

The umbc4 theme

This is inspired by a well-known *PowerPoint* theme.

```
\documentclass{beamer}
\usetheme{umbc4}
```



A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

Customizing the umbc themes

Beamer customization options described in [Customizing themes](#) apply to UMBC themes as well. For instance, here is what umbc2 looks like in the *RawSienna* color and centered title in italics:

```
\documentclass[xcolor=dvipsnames]{beamer}
\usetheme{umbc2}
\usecolortheme[named=RawSienna]{structure}
\setbeamerfont{frametitle}{family=\rmfamily,shape=\itshape}
\setbeamertemplate{frametitle}[default][center]
```

*A sample slide***Theorem (The Poincaré inequality)**

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ➊ enumerated item 1 |
| • itemized item 2 | ➋ enumerated item 2 |
| • itemized item 3 | ➌ enumerated item 3 |

Remark: If you have a department account, you don't need to do anything special to use the UMBC themes -- they are already installed. If you *don't* have a department account, you may download the UMBC theme collection [beamer-umbc.tgz](#) and install alongside Beamer's own theme files. Here is the [beamer-umbc.readme](#) file from that collection.

³ UMBC themes do not provide *navigation bars*. I haven't mentioned navigation bars in these notes because I don't like them. In my opinion, navigation bars are distracting and unnecessary. Sectioning commands are ignored in UMBC themes but `\tableofcontents` still works.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

9 The UMBC footnote

The Beamer outer theme *umbcfootline* puts footer information along the bottom edges of slides. The default footnote looks like this:

```
Author, Institute Title, Subtitle n/N
```

where n is the sequence number of this frame and N is the total number of frames.

The fields *Author*, *Institute*, *Title* and *Subtitle* are filled with the data supplied by the `\author`, `\institute`, `\title` and `\subtitle` commands. Short versions of these entries are used, if provided, otherwise long versions are used. See [Titlepage elements](#) for the meanings of "long" and "short" fields.

You invoke the *umbcfootline* theme by putting the following in your document's preamble:

```
\useoutertheme{umbcfootline}
```

In the following example, I have added a *umbcfootline* to Beamer's *default* theme:

```
\documentclass{beamer}
\usetheme{default}
\useoutertheme{umbcfootline}
\author{Rouben Rostamian}
\title{Beamer tutorial}
\institute{UMBC}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

UMBC themes *umbc1*, *umbc2* and *umbc4* include *umbcfootline* by default, therefore there is no need to invoke *umbcfootline* explicitly with these themes.

Redefining the footline

You may override the default contents of a *umbcfootline* with the `\setfootline` command. For instance, to change the footline to:

```
Institute, Date slide n/N
```

put the following in the preamble:

```
\useoutertheme{umbcfootline}
\setfootline{\insertshortinstitute, \insertshortdate
  \hfill slide \insertframenum/\inserttotalframenum}
```

Items that you can `\insert...` in a footline, are:

- `\insertshortauthor`
- `\insertshortinstitute`
- `\insertshorttitle`
- `\insertshortsubtitle`
- `\insertshortdate`
- `\insertframenum`
- `\inserttotalframenum`

If you use `\insertshortauthor` and if "short author" is not provided, then "long author" is substituted for it. Same applies to the other `\insertshort...` fields. See [Titlepage elements](#) for the meanings of "long" and "short" fields.

If you really want to insert the long versions of the requested field, use `\insertauthor`, `\inserttitle`, etc.

Dynamic footlines

To change the footline of an individual slide, put a `\setfootline{...}` command just before the slide's `\begin{frame}`. This will change the footline of this and all subsequent slides.

To limit the change only to one slide, limit the scope of the `\setfootline` by enclosing it in braces, as in:

```
{ % brace limits \setfootline's scope
\setfootline{...}
\begin{frame}
...
\end{frame}
} % brace limits \setfootline's scope
```

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

10 The UMBC tribullet markers

The `umbctribullets` package provides attractive triangular markers for itemized lists. To set itemization bullets to UMBC tribullets, put the command `\useinnertheme{umbctribullets}` in the preamble.

This works with not only with UMBC themes but all other Beamer themes as well. In the following example we use `umbctribullets` with Beamer's *default* theme:

```
% umbctribullets-demo.tex
\documentclass{beamer}
\usetheme{default}
\useinnertheme{umbctribullets}
\begin{document}

\begin{frame}
  \frametitle{UMBC tribulet markers}

\begin{itemize}
\item item 1
  \begin{itemize}
    \item item 1
      \begin{itemize}
        \item item 1
        \item item 2
        \item item 3
      \end{itemize}
    \item item 2
    \item item 3
    \item item 4
  \end{itemize}
\item item 2
\item item 3
\item item 4
\end{itemize}

\end{frame}
\end{document}
```

UMBC tribulet markers

- ▶ item 1
 - ▶ item 1
 - ▶ item 1
 - ▶ item 2
 - ▶ item 3
 - ▶ item 2
 - ▶ item 3
 - ▶ item 4
- ▶ item 2
- ▶ item 3
- ▶ item 4



The default colors may be changed using the command `\umbctribulletscolors` command which takes three arguments, corresponding to nesting level of the markers. (Tribullet markers are not available beyond three nesting levels.) As an example:

```
\umbctribulletscolors{purple}{violet}{brown}
```

The default tribullet colors are defined as:

```
\umbctribulletscolors{red}{blue}{orange!40!yellow}
```

For the meaning of `orange!40!yellow` see [Blending Colors](#).

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

11 UMBC boxes

The package *umbcboxes* helps you display text and equations in fancy boxes with rounded corners and shadows like those shown in the following samples.



Fancy boxes

The *displaybox* environment is suitable for boxing displayed mathematics:

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

The body of the environment can be anything. For example:

This is a test.

Centered text may look better:

This is a test.

2/2



Fancy boxes (continued)

The *onlinebox* environment is similar to *displaybox*, but it puts the boxed material within the current line like this. Box contents are automatically centered.

The body of an *onlinebox* may contain mathematics. As in this

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$
 example.

To get display-style mathematics

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

add the

`\displaystyle` command to your formula.

2/2

The package *umbcboxes* defines two environments: *displaybox* and *onlinebox*.

A Beamer Quickstart

The *displaybox* environments is meant to be used with displayed math, however anything else can be boxed with it as well, as the examples below illustrate.

The *onlinebox* is meant to be used within the running text.

These environment don't attempt to guess the widths of the desired boxes -- you are expected to specify their widths, typically after some trial and error. This is not such a bad thing; finding an aesthetically pleasing box size is not a job for a computer.

You can get a flavor of the usage of these environments from these fragments.

Displayed math:

```
\begin{displaybox}{5cm}      % width of the box is 5cm
\[
    \cos^2 x + \sin^2 x = 1
\]
\end{displaybox}
```

Online material:

The important formula, `\begin{inlinebox}{3cm} $\cos^2 x + \sin^2 x = 1$ \end{inlinebox}` occurs very frequently in mathematics.

In specifying box widths, it is useful to have in mind that the overall size of a Beamer slide is 128mm x 96mm.

The background color of the boxes is set to `structure!15!bg` by default. (See [The structure color](#) and [All about colors](#) for the meaning of this.) The default color may not be particularly exciting in general, therefore it is likely that you will want to change it to something more interesting. The `\setbeamercolor` command in the illustration below shows how.

Here is the complete code that produced the two slides shown at the top of this page.

```
% umbcboxes-demos.tex
\documentclass{beamer}
\usetheme{umbc4}
\useinnertheme{umbcboxes}
\setbeamercolor{umbcboxes}{bg=violet!15,fg=black} % redefine box color!
\begin{document}

\begin{frame}
  \frametitle{Fancy boxes}

  The \textsl{displaybox} envrionment is suitable for boxing
  displayed mathematics:
  \begin{displaybox}{4cm}
    \[
      \sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}
    \]
  \end{displaybox}
  \bigskip

  The body of the environment can be anything. For example:
  \begin{displaybox}{5cm}
```

A Beamer Quickstart

```
This is a test.  
\end{displaybox}  
\bigskip
```

Centered text may look better:

```
\begin{displaybox}{5cm}  
\centerline{This is a test.}  
\end{displaybox}
```

```
\end{frame}
```

```
\begin{frame}  
  \frametitle{Fancy boxes (continued)}
```

The `\textsl{onlinebox}` environment is similar to `\textsl{displaybox}`, but it puts the boxed material within the current line

```
\begin{onlinebox}{2cm} like this.\end{onlinebox}
```

Box contents are automatically centered.

```
\bigskip
```

The body of an `\textsl{onlinebox}` may contain mathematics. As in this

```
\begin{onlinebox}{3cm}
```

```

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

```

```
\end{onlinebox} example.
```

```
\bigskip
```

To get display-style mathematics

```
\begin{onlinebox}{3cm}
```

```

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

```

```
\end{onlinebox}
```

add the `\textsl{\backslashdisplaystyle}` command to your formula.

```
\end{frame}
```

```
\end{document}
```

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

12 The title page

Beamer provides an easy way to make a title page for your presentation. The following source code defines a titlepage and a regular slide.

```
% titlepage-demo.tex
\documentclass{beamer}
\usetheme{umbc4}

% items enclosed in square brackets are optional; explanation below
\title[A short proof]{A short proof of Fermat's Last Theorem}
\subtitle[Errors]{Estimation of numerical errors}
\author[R. Rostamian]{Rouben Rostamian}
\institute[UMBC]{
  Department of Mathematics and Statistics\\
  University of Maryland, Baltimore County\\
  Baltimore, Maryland 21250\\[1ex]
  \texttt{rostamian@umbc.edu}
}
\date[November 2004]{November 26, 2004}

\begin{document}

%--- the titlepage frame -----%
\begin{frame}[plain]
  \titlepage
\end{frame}

%--- the presentation begin here -----%
\begin{frame}
  \frametitle{Overview}

  Overview of the material.
\end{frame}

\end{document}
```

Here are the results:

A short proof of Fermat's Last Theorem

Estimation of numerical errors

Rouben Rostamian

Department of Mathematics and Statistics
University of Maryland, Baltimore County
Baltimore, Maryland 21250
`rostamian@umbc.edu`

November 26, 2004



Overview

Overview of the material.

R. Rostamian, UMB-C

A short proof, Errors

2/2

Observe that some of the information provided on titlepage, such title, author, etc., also appears in the footline of the subsequent slide.

Titlepage elements

Titlepage elements are specified through the commands `\title`, `\subtitle`, `\author`, `\institute`, `\date`.

The data given to these commands appears not only in the title page, but also in the footline section of the

subsequent slides (see the image above.)

Each titlepage element can be specified using a single argument, as in:

```
\title{University of Maryland, Baltimore County}
```

or using two arguments, as in:

```
\title[UMBC]{University of Maryland, Baltimore County}.
```

The optional argument, *UMBC* (in square brackets) is the *short form* of the institute's name.

The long forms of titlepage elements are used on the title page. The short forms of titlepage elements are used in the footers of the subsequent slides.

Please note that if a short form is not provided, then the long form will be used in the footers. If long forms are too long, then footers may get garbled.

About the [plain] qualifier

In the sample source code shown above, note the [plain] qualifier in the line

```
\begin{frame}[plain]
```

that generates the titlepage.

Without that qualifier, the title page would have been drawn with header and footer decorations, like all other slides. The [plain] qualifier *suppresses the drawing of these decorations*. Compare the two images shown on top of this page.

Judge for yourself if showing such decorations is appropriate for a title page.

In general, the [plain] qualifier may be used on any frame to suppress the drawing of frame decorations on that frame.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

13 Including graphics

Beamer recognizes images in any of the pdf, png and jpg formats. (Note that *PostScript* is not among these.)

The following sample we include three pictures side-by-side in a slide.

```
% graphics.tex
\documentclass{beamer}
\usetheme{Copenhagen}
\begin{document}

\begin{frame}
  \frametitle{Graphics}
```

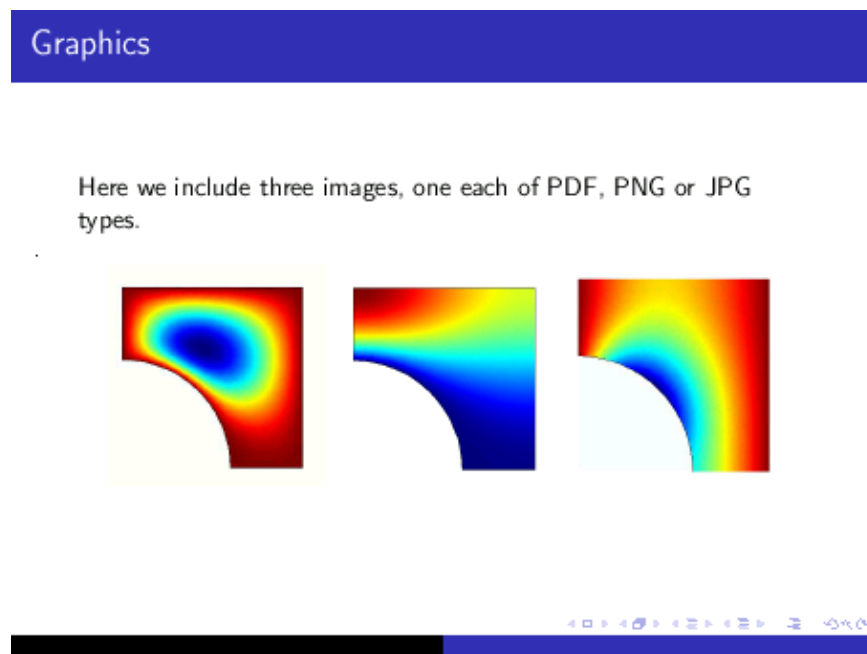
Here we include three images, one each of PDF, PNG, and JPG types.

```
\begin{center}
  \includegraphics[width=0.3\textwidth]{image1.pdf}
  \includegraphics[width=0.3\textwidth]{image2.png}
  \includegraphics[width=0.3\textwidth]{image3.jpg}
\end{center}

\end{frame}

\end{document}
```

Here is the result:



Converting graphics

A Beamer Quickstart

When you create an image with the intention of including it in a Beamer document, it is best if you save it in one of the pdf, png or jpg formats that are recognizable by Beamer.⁴ This is sometimes not possible. For instance, you may have downloaded the image from somewhere and it is in the gif format.

The department's computer facilities provide a large number of utilities for converting and modifying graphical images.

eps to pdf

To convert an Encapsulated PostScript image to pdf, do:

```
epstopdf filename.eps
```

This will produce a file named *filename.pdf*.⁵

All other conversions

The general-purpose `convert`⁶ command converts from any graphics format to any other graphics format. For instance, to convert a gif file to the png format, do:

```
convert filename.gif filename.png
```

Similarly, to convert a tiff file to jpg, do:

```
convert filename.tiff filename.jpg
```

In fact, we can have `convert` take over the job of `epstopdf` as well, as in:

```
convert filename.eps filename.pdf
```

however in my experience `epstopdf` produces better results.

⁴ The png format works best for line drawings, such as graphs of functions in 2D. The jpg format works best with gradually varying shades, such as the photograph of a person's face.

⁵ The `epstopdf` utility is a perl script that calls `ghostscript` to do the actual conversion. In many Linux distributions it is bundled with the main TeX/LaTeX package.

⁶ The `convert` utility is a part of *ImageMagick* suite of graphics manipulation utilities.

14 Overlays

Probably the most interesting effect achieved by Beamer is *overlays*, which gives the appearance of incremental exposure of a given slide.

Achieving the overlay effect in Beamer is quite simple -- just insert a `\pause` command anywhere you want to pause the display.

For instance, to expose an itemized list one-item-at-a-time, do:

```
\documentclass{beamer}
\usetheme{default}
\begin{document}

\begin{frame}
  \frametitle{Outline of the talk}

  \begin{itemize}
    \item Introduction
    \pause
    \item Statement of the main theorem
    \pause
    \item Technical lemmata
    \pause
    \item Proof of the main theorem
    \pause
    \item Conclusions
  \end{itemize}
\end{frame}

\end{document}
```

When this file is compiled into the pdf format and displayed with a pdf viewer, such as the Acrobat Reader, the items are exposed one-at-a-time as you page forward through the document in the usual way.

The use of the `\pause` command is not restricted to itemized lists; you may use it anywhere in a slide. For example:

```
\documentclass{beamer}
\usetheme{Malmoe}
\begin{document}

\begin{frame}
  \frametitle{Fermat's Last Theorem}

  In this talk I will give a very elementary proof of the
  theorem. I am surprised that no one else has thought of
  this before.
  \medskip

  \pause

  Fermat's Last Theorem says that the equation
  \[
    x^2 + y^2 = z^2
  \]
```

A Beamer Quickstart

has no solution in the set of natural numbers.

`\medskip`

`\pause`

This is not true. After a lengthy calculation on the department's Linux machines, I have verified that within the numerical accuracy of the Pentium-4 processor, we have:

`\[`
5000² + 12000² = 13000²
`\]`

`\end{frame}`

`\end{document}`

A pdf viewer will expose the resulting file one paragraph at a time. The fully exposed slide looks like this:

Fermat's Last Theorem

In this talk I will give a very elementary proof of the theorem. I am surprised that no one else has thought of this before.

Fermat's Last Theorem says that the equation

$$x^2 + y^2 = z^2$$

has no solution in the set of natural numbers.

This is not true. After a lengthy calculation on the department's Linux machines, I have verified that within the numerical accuracy of the Pentium-4 processor, we have:

$$5000^2 + 12000^2 = 13000^2$$



[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

15 Navigating with hyperlinks

During a live slide presentation, it is sometimes necessary to jump several slides back to remind the audience of a formula or a picture. You don't want to page through 17 slides to go to that particular slide and back through 17 slides to return to where you were.

Hyperlinks in a pdf file enable you to jump from one slide to any other slide with one mouse click.

The following input file defines two slides. You should imagine that these are among a large number of slides which are not shown here to save space.

One slide is identified by the `label=intro` tag on its `\begin{frame}` command. This is our target slide.

The other slide contains the code `\hyperlink{intro}{here}`. The word "here" will appear in red in the pdf viewer. When you click on "here", the viewer will jump to the frame labeled `intro`.

Remark: Actually, what I wrote above is not exactly true. By default, hyperlinks are shown in the normal text color thus are not distinguishable from surrounding text. The red color of hyperlinks is prescribed in the `hypersetup` command as shown in the sample code below.

Alternatively, a hyperlink may be drawn as a "beamer button". For instance, to make a button with the text "here" on it, we do: `\hyperlink{intro}{\beamerbutton{here}}`. Four different button styles are available:



These buttons were made using:

```
\beamerbutton{here}
\beamergetobutton{here}
\beamerskipbutton{here}
\beamerreturnbutton{here}
```

They only *look* different; they all do the same thing. Use the one that fits your need.

OK, here a complete LaTeX file that illustrates these concepts:

```
% hyperlinks.tex
\documentclass{beamer}
\usetheme{default}
\hypersetup{colorlinks=true,linkcolor=red}
\begin{document}

%--- frame -----%
\begin{frame}[label=intro]
  \frametitle{Introduction}

  The contents of the slide here

\end{frame}
```

A Beamer Quickstart

```
%--- frame -----%
\begin{frame}
  \frametitle{Some other slide}

  If you press \hyperlink{intro}{here}, you will jump to the frame
  labeled "intro".

  Similarly, pressing \hyperlink{intro}{\beamerbutton{here}} will
  take you to that same frame.

\end{frame}


\end{document}
```

The second of the two frames defined above is shown in the figure below. If in the pdf browser you click on the red word "here" or on the blue button, the browser will jump to the first slide labeled `intro`.

It is difficult to illustrate the dynamic action of hyperlinks with words. I suggest that you cut and paste the code above into a file, compile, and try it yourself.

Some other slide

If you press **here**, you will jump to the frame labeled "intro".

Similarly, pressing  will take you to that same frame.



Returning to the calling page

Now you know how to jump from page N_1 to page N_2 . But how to you return to page N_1 ? Well, you can page through all the intervening pages to get there, but that's not very professional.

To jump to the page where you came from in a single step, do:

if using the Acrobat Reader:

press **Control-Left Arrow** (that is, hold down the **Control** key and press the **Left Arrow** key.)

if using Xpdf:

press the **b** key.

A Beamer Quickstart

Remark: Yet another way to return to the calling page would be by adding another hyperlink that works in the opposite way. Thus you put a hyperlink in page N_1 that takes you to page N_2 , and put a hyperlink in page N_2 that takes you to page N_1 . This trick is somewhat difficult to use in practice. Suppose that you have an important formula on page N_1 . You want to put links in pages N_2 and N_3 and N_4 , each of which takes you to page N_1 . But once in page N_1 , it could be confusing as to which of the pages N_2 or N_3 or N_4 you are supposed to return to. The pdf viewer methods described above do not have this problem.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

16 Theorems and such

In Beamer the following LaTeX environments are predefined:

- theorem
- corollary
- definition
- example
- proof

The Beamer theme controls how this environments are rendered. Here is an example:

```
% theorems-demo-1.tex
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}
  \frametitle{Theorems and such}

  \begin{definition}
    A triangle that has a right angle is called
    a \emph{right triangle}.
  \end{definition}

  \begin{theorem}
    In a right triangle, the square of hypotenuse equals
    the sum of squares of two other sides.
  \end{theorem}

  \begin{proof}
    We leave the proof as an exercise to our astute reader.
    We also suggest that the reader generalize the proof to
    non-Euclidean geometries.
  \end{proof}

\end{frame}
\end{document}
```


A Beamer Quickstart

The standard LaTeX `\newtheorem` command may be used to extend the available theorem-like environments. For instance, if you put:

```
\newtheorem{proposition}{Proposition}
```

in the preamble, then you can say:

```
\begin{proposition}  
...  
\end{proposition}
```

⁷ On the department's machine, this file is located in the directory:

```
/usr/share/texmf/doc/latex/amscls/
```

You can view the file using the command:

```
xdvi /usr/share/texmf/doc/latex/amscls/amsthdoc.dvi &
```

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

17 Splitting a slide into columns

Beamer's *columns* environment provides an easy way to split a slide vertically into columns. This is particularly useful in positioning figures in a slide or creating multi-column itemized lists.

The following example shows how.

```
% columns-demo1.tex
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}
  \frametitle{Splitting a slide into columns}

  The line you are reading goes all the way across the slide.
  From the left margin to the right margin. Now we are going
  the split the slide into two columns.
  \bigskip

  \begin{columns}
    \begin{column}{0.5\textwidth}
      Here is the first column. We put an itemized list in it.
      \begin{itemize}
        \item This is an item
        \item This is another item
        \item Yet another item
      \end{itemize}
    \end{column}

    \begin{column}{0.3\textwidth}
      Here is the second column. We will put a picture in it.
      \centerline{\includegraphics[width=0.7\textwidth]{image2.png}}
    \end{column}
  \end{columns}
  \bigskip

  The line you are reading goes all the way across the slide.
  From the left margin to the right margin.

\end{frame}

\end{document}
```

The input file above produces the following slide:

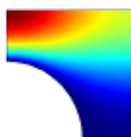
Splitting a slide into columns

The line you are reading goes all the way across the slide. From the left margin to the right margin. Now we are going to split the slide into two columns.

Here is the first column. We put an itemized list in it.

- This is an item
- This is another item
- Yet another item

Here is the second column. We will put a picture in it.



The line you are reading goes all the way across the slide. From the left margin to the right margin.



Remark: To split a slide into three or more columns, add any number of `\begin{column} . . . \end{column}` as needed. Just make sure that the sum of their widths does not exceed the slide width, that is `\textwidth`.

Remark: Within each column, the variable `\textwidth` is redefined to refer to *that column's width*. For instance, in the sample shown above, the width of image is set to `0.7\textwidth` which means 0.7 times the *width of the column containing the image*.

Remark: I find it easier giving widths of columns in terms of fractions of `\textwidth`. If you wish, however, you may specify absolute widths, such as: `\begin{column}{30mm}`. For this, you should know that the overall size of a Beamer slide is 128mm x 96mm.

Vertical alignment

Observe that in the sample slide shown above, the vertical mid-points of the two columns are horizontally aligned. We say the columns are *center-aligned*, for short.

The option `[t]` to the *columns* environment, as in `\begin{columns}[t]`, causes the columns to be *top-aligned*.

Other options are `[b]` for bottom-alignment and `[c]` for center-alignment (which is the default).

In the following example the columns are top-aligned:

```
% columns-demo2.tex
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}
```

A Beamer Quickstart

```
\frametitle{Splitting a slide into columns}
```

The line you are reading goes all the way across the slide. From the left margin to the right margin. Now we are going to split the slide into two columns.

```
\bigskip

\begin{columns}[t]
  \begin{column}{0.5\textwidth}
    Here is the first column. We put an itemized list in it.
    \begin{itemize}
      \item This is an item
      \item This is another item
      \item Yet another item
    \end{itemize}
  \end{column}

  \begin{column}{0.3\textwidth}
    Here is the second column. We will put a picture in it.
    \centerline{\includegraphics[width=0.7\textwidth]{image2.png}}
  \end{column}
\end{columns}
\bigskip
```

The line you are reading goes all the way across the slide. From the left margin to the right margin.

```
\end{frame}
```

```
\end{document}
```

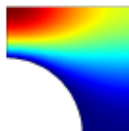
Splitting a slide into columns

The line you are reading goes all the way across the slide. From the left margin to the right margin. Now we are going to split the slide into two columns.

Here is the first column. We put an itemized list in it.

- This is an item
- This is another item
- Yet another item

Here is the second column. We will put a picture in it.



The line you are reading goes all the way across the slide. From the left margin to the right margin.

Navigation icons: back, forward, search, etc.

Vertical alignment with images

Sometimes you may find out that the option `[t]` for top-alignment gives unexpected results. The following example shows one such case. The only difference between this and the previous example is that I have

interchanged the image and text in the second column.

```
% columns-demo3.tex
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}
  \frametitle{Splitting a slide into columns}

  The line you are reading goes all the way across the slide.
  From the left margin to the right margin.  Now we are going
  the split the slide into two columns.
  \bigskip

  \begin{columns}[t]
    \begin{column}{0.5\textwidth}
      Here is the first column.  We put an itemized list in it.
      \begin{itemize}
        \item This is an item
        \item This is another item
        \item Yet another item
      \end{itemize}
    \end{column}

    \begin{column}{0.3\textwidth}
      \centerline{\includegraphics[width=0.7\textwidth]{image2.png}}
      Here is the second column.  We will put a picture in it.
    \end{column}
  \end{columns}
  \bigskip

  The line you are reading goes all the way across the slide.
  From the left margin to the right margin.

\end{frame}

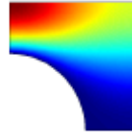
\end{document}
```

Splitting a slide into columns

The line you are reading goes all the way across the slide. From the left margin to the right margin. Now we are going to split the slide into two columns.

Here is the first column. We put an itemized list in it.

- This is an item
- This is another item
- Yet another item



Here is the second column. We will put a picture in it.

The line you are reading goes all the way across the slide. From the left margin to the right margin.



As you see, the columns are not top-aligned at all!

What is happening here is that the bottom of the image is being taken as the image's reference point. Therefore the bottom of the image is being aligned with the top of the first column. This is not what we want!

We want the *top* of the image to be taken as the reference point, so that the top of the image is aligned with the top of the first column. To achieve this, Beamer provides the `[T]` alignment option. The following example shows the result.

```
% columns-demo4.tex
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}
  \frametitle{Splitting a slide into columns}

  The line you are reading goes all the way across the slide.
  From the left margin to the right margin. Now we are going
  the split the slide into two columns.
  \bigskip

  \begin{columns}[T]
    \begin{column}{0.5\textwidth}
      Here is the first column. We put an itemized list in it.
      \begin{itemize}
        \item This is an item
        \item This is another item
        \item Yet another item
      \end{itemize}
    \end{column}

    \begin{column}{0.3\textwidth}
      \centerline{\includegraphics[width=0.7\textwidth]{image2.png}}
      Here is the second column. We will put a picture in it.
    \end{column}
  \end{columns}
```

A Beamer Quickstart

```
\end{columns}  
\bigskip
```

The line you are reading goes all the way across the slide.
From the left margin to the right margin.

```
\end{frame}
```

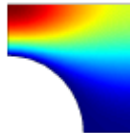
```
\end{document}
```

Splitting a slide into columns

The line you are reading goes all the way across the slide. From the left margin to the right margin. Now we are going to split the slide into two columns.

Here is the first column. We put an itemized list in it.

- This is an item
- This is another item
- Yet another item



Here is the second column. We will put a picture in it.

The line you are reading goes all the way across the slide. From the left margin to the right margin.

Navigation icons: back, forward, search, etc.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

18 Vertical alignment within slides

Vertical alignment in individual slides

The contents of Beamer slides are vertically centered within slides. This is particularly noticeable if there is very little material in the slide.

The options `t`, `c` or `b` to `\begin{frame}` cause the contents of the slide to be aligned with the top, center or bottom of the slide, respectively. The default option is `c`.

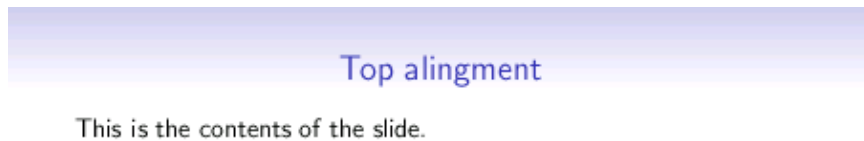
The following example illustrate this:

```
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}[t]
  \frametitle{Top alingment}
```

This is the contents of the slide.

```
\end{frame}
\end{document}
```



```
\documentclass{beamer}
\usetheme{Singapore}
\begin{document}

\begin{frame}[c]    % [c] is the default
  \frametitle{Center alingment (default)}
```

A Beamer Quickstart

This is the contents of the slide.

```
\end{frame}  
\end{document}
```

Center alingment (default)

This is the contents of the slide.



```
\documentclass{beamer}  
\usetheme{Singapore}  
\begin{document}  
  
\begin{frame}[b]  
  \frametitle{Bottom alingment}  
  
  This is the contents of the slide.  
  
\end{frame}  
\end{document}
```



Bottom alingment

This is the contents of the slide.



Vertical alignment for the entire document

You may set the vertical alignment policy for the entire document by giving one of the options `t` or `b` to the `\documentclass`. For instance:

```
\documentclass[t]{beamer}
```

will cause the contents of all slides to be top-aligned. You can override this for individual slides by using the `c` or `b` options with `\begin{frame}`.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

19 The default font size

Beamer's default font size is 11 points. It is possible to set the default font size to any of 8, 9, 10, 11, 12, 14, 17, 20 on the `\documentclass` line. For instance, to set the default font to 14 points, do:

```
\documentclass[14pt]{beamer}
```

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

20 The default text color

Beamer's normal text is black on white background. The following command in the preamble changes all normal text to purple:

```
\setbeamercolor{normal text}{fg=purple}
```

The `fg` in command above sets normal text's *foreground* color. It is also possible to set the normal text's *background* color. The background color of a slide is inherited from the normal text's background, therefore changing the normal text's background color amounts to changing the slide's background color. See [Setting the background to a solid color](#) for an illustration.

Remark: *Normal text* is the text in the main body of a slide. A slide's header and footer are not normal text. The colors of those elements are controlled by the *structure* color. For instance, the following command changes slide titles (and several other things) to purple:

```
\setbeamercolor{structure}{fg=purple}
```

See the sections [An image for a background](#) and [The structure color](#) for illustrations.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

21 The structure font and font themes

Beamer's *structure font* determines the font for rendering a presentation's structural elements such as headers and footers and some titlepage entries.

The default structure font for most themes is a medium-weight, upright, sans-serif font. Here is the theme `umbc2` rendered with Beamer's default structure font:

```
\documentclass[14pt]{beamer}
\usetheme{umbc2}
```

The slide is titled "A Beamer tutorial" in a medium-weight, upright, sans-serif font. Below the title is the subtitle "L^AT_EX Presentations Made Easy". The author's name "Rouben Rostamian" is centered, followed by his affiliation: "Department of Mathematics and Statistics, University of Maryland, Baltimore County, Baltimore, Maryland 21250" and his email "rostamian@umbc.edu". The date "November 26, 2004" is at the bottom. The slide is divided into two columns. The right column is titled "A sample frame" and contains the text "Here are a few simple equations:" followed by three equations: $\sin^2 x + \cos^2 x = 1$, $a^2 x + b^2 y = c^2 z$, and $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$. The footer of the slide shows the author's name, the title, and the page number "1/2".

Let's change the structure font to italics. Note the changes in the titlepage and headers and footers of the slides.

```
\documentclass[14pt]{beamer}
\setbeamerfont{structure}{family=\rmfamily,shape=\itshape}
\usetheme{umbc2}
```

The slide is titled "A Beamer tutorial" in an italicized, medium-weight, upright, sans-serif font. Below the title is the subtitle "L^AT_EX Presentations Made Easy". The author's name "Rouben Rostamian" is centered, followed by his affiliation: "Department of Mathematics and Statistics, University of Maryland, Baltimore County, Baltimore, Maryland 21250" and his email "rostamian@umbc.edu". The date "November 26, 2004" is at the bottom. The slide is divided into two columns. The right column is titled "A sample frame" in italics and contains the text "Here are a few simple equations:" followed by the same three equations as the previous slide: $\sin^2 x + \cos^2 x = 1$, $a^2 x + b^2 y = c^2 z$, and $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$. The footer of the slide shows the author's name, the title, and the page number "1/2".

Here are a few more examples.

Slanted structure font:

```
\documentclass[14pt]{beamer}
\setbeamerfont{structure}{shape=\itshape}
\usetheme{umbc2}
```

A sample frame

Here are a few simple equations:

$$\sin^2 x + \cos^2 x = 1$$

$$a^2x + b^2y = c^2z$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Bold structure font:

```
\documentclass[14pt]{beamer}
\setbeamerfont{structure}{series=\bfseries}
\usetheme{umbc2}
```

A sample frame

Here are a few simple equations:

$$\sin^2 x + \cos^2 x = 1$$

$$a^2x + b^2y = c^2z$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Bold and italic structure font:

```
\documentclass[14pt]{beamer}
\setbeamerfont{structure}{family=\rmfamily,series=\bfseries,shape=\itshape}
\usetheme{umbc2}
```

A sample frame

Here are a few simple equations:

$$\sin^2 x + \cos^2 x = 1$$

$$a^2x + b^2y = c^2z$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Font themes

Beamer offers a predefined set of font options which affect not only the structural elements, but the normal text and mathematics. I will give only a few illustrations here. For a complete description of Beamer font themes you should read Beamer's documentation.

The font theme *serif* changes all document fonts to serif. This includes structure elements as well as normal text and (most of) mathematics.

```
\documentclass[14pt]{beamer}
\usefonttheme{serif}
\usetheme{umbc2}
```

A sample frame

Here are a few simple equations:

$$\sin^2 x + \cos^2 x = 1$$

$$a^2 x + b^2 y = c^2 z$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Rouben Rostamian, UMBC

A Beamer tutorial, A tutorial

2/1

As you see, `\sin` and `\cos` are still set in sans-serif. This appears to be a Beamer bug.

The option `stillsansseriftext` exempts the normal text from changing to serif:

```
\documentclass[14pt]{beamer}
\usefonttheme[stillsansseriftext]{serif}
\usetheme{umbc2}
```

A sample frame

Here are a few simple equations:

$$\sin^2 x + \cos^2 x = 1$$

$$a^2 x + b^2 y = c^2 z$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Rouben Rostamian, UMBC

A Beamer tutorial, A tutorial

2/1

The option `stillssansserifmath` exempts mathematics from changing to serif:

```
\documentclass[14pt]{beamer}
\usefonttheme[stillssansseriftext,stillssansserifmath]{serif}
\usetheme{umbc2}
```

A sample frame

Here are a few simple equations:

$$\sin^2 x + \cos^2 x = 1$$

$$a^2 x + b^2 y = c^2 z$$

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

Rouben Rostamian, UMBC

A Beamer tutorial, A tutorial

2/1

The font theme *structuresmallcapsserif* changes many document elements to the smallcap font:

```
\documentclass[14pt]{beamer}
```

A Beamer Quickstart

```
\usefonttheme{structuresmallcapsserif}  
\usetheme{umbc2}
```

	A SAMPLE FRAME
<p>A BEAMER TUTORIAL L^AT_EX PRESENTATIONS MADE EASY</p> <p>Rouben Rostamian</p> <p>Department of Mathematics and Statistics University of Maryland, Baltimore County Baltimore, Maryland 21250 rostamian@umbc.edu</p> <p>November 26, 2004</p>	<p>Here are a few simple equations:</p> $\sin^2 x + \cos^2 x = 1$ $a^2x + b^2y = c^2z$ $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$
Rouben Rostamian, UMBC	A BEAMER TUTORIAL, A TUTORIAL
1/5	2/5

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

22 Shrinking to make things fit

To squeeze a little extra material into a Beamer slide, you may specify a shrink-factor for that slide, as in:

```
\begin{frame}[shrink=5]  
...  
\end{frame}
```

This will scale down the contents of the slide by *at least 5 percent*, and more if needed, so that the contents fit completely within the slide.

For best results, you should specify a shrink factor as close to the needed amount as possible. If your specified value is inadequate, Beamer will issue a warning to let you know. Adjust the shrink factor so that the warning goes away. Otherwise the slide's horizontal spacing will not be optimal.

You should not abuse this feature -- a small amount of shrinkage may go unnoticed, but too much shrinkage can be visually unpleasant.

Instead of shrinking a slide, consider rewriting its contents or perhaps splitting it into two slides.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

23 Changing margin widths

The size of a Beamer slide is 128mm by 96mm. These dimensions are fixed and should not be changed.

It is permissible, however, to change the widths of the left and right margins. These are set to 1cm by default.

In the example below, we change the widths of the left and right margins to 6mm and 2mm, respectively.

```
\setbeamersize{text margin left=6mm}  
\setbeamersize{text margin right=2mm}
```

It is possible to combine the two command into one:

```
\setbeamersize{text margin left=6mm, text margin right=2mm}
```

[*\[contents\]*](#) [*\[index\]*](#) [*\[previous\]*](#) [*\[next\]*](#)

[*\[contents\]*](#) [*\[index\]*](#) [*\[previous\]*](#) [*\[next\]*](#)

24 All about colors

Beamer handles colors with the help of an external facility called `xcolor`⁸. Beamer loads `xcolor` by default; you don't need to load it explicitly. This makes the following named colors available:



Named colors from the dvips package

`Xcolor` can read an extended set of color names from the file

/usr/share/texmf/tex/latex/graphics/dvipsnam.def

To make this extended set available to Beamer, invoke Beamer as:

```
\documentclass[xcolor=dvipsnames]{beamer}
```

Here is what the extended color set looks like:

A Beamer Quickstart

 <i>Green Yellow</i>	 <i>RubineRed</i>	 <i>RoyalPurple</i>	 <i>Emerald</i>
 <i>Yellow</i>	 <i>WildStrawberry</i>	 <i>BlueViolet</i>	 <i>JungleGreen</i>
 <i>Goldenrod</i>	 <i>Salmon</i>	 <i>Periwinkle</i>	 <i>SeaGreen</i>
 <i>Dandelion</i>	 <i>CarnationPink</i>	 <i>CadetBlue</i>	 <i>Green</i>
 <i>Apricot</i>	 <i>Magenta</i>	 <i>CornflowerBlue</i>	 <i>ForestGreen</i>
 <i>Peach</i>	 <i>VioletRed</i>	 <i>MidnightBlue</i>	 <i>PineGreen</i>
 <i>Melon</i>	 <i>Rhodamine</i>	 <i>NavyBlue</i>	 <i>LimeGreen</i>
 <i>YellowOrange</i>	 <i>Mulberry</i>	 <i>RoyalBlue</i>	 <i>YellowGreen</i>
 <i>Orange</i>	 <i>RedViolet</i>	 <i>Blue</i>	 <i>SpringGreen</i>
 <i>BurntOrange</i>	 <i>Fuchsia</i>	 <i>Cerulean</i>	 <i>OliveGreen</i>
 <i>Bittersweet</i>	 <i>Lavender</i>	 <i>Cyan</i>	 <i>RawSienna</i>
 <i>RedOrange</i>	 <i>Thistle</i>	 <i>ProcessBlue</i>	 <i>Sepia</i>
 <i>Mahogany</i>	 <i>Orchid</i>	 <i>SkyBlue</i>	 <i>Brown</i>
 <i>Maroon</i>	 <i>DarkOrchid</i>	 <i>Turquoise</i>	 <i>Tan</i>
 <i>BrickRed</i>	 <i>Purple</i>	 <i>TealBlue</i>	 <i>Gray</i>
 <i>Red</i>	 <i>Plum</i>	 <i>Aquamarine</i>	 <i>Black</i>
 <i>OrangeRed</i>	 <i>Violet</i>	 <i>BlueGreen</i>	 <i>White</i>

Named colors from the SVG package

Xcolor can read an even a larger set of color names from the file⁹

/usr/local/share/texmf/tex/latex/xcolor/svgnam.def

To make this extended set available to Beamer, invoke Beamer as:

```
\documentclass[xcolor=svgnames]{beamer}
```

Here is what the SVG color set looks like:

A Beamer Quickstart

 AliceBlue	 DarkSlateGrey	 LightPink	 PaleVioletRed
 AntiqueWhite	 DarkTurquoise	 LightSalmon	 PapayaWhip
 Aqua	 DarkViolet	 LightSeaGreen	 PeachPuff
 Aquamarine	 DeepPink	 LightSkyBlue	 Peru
 Azure	 DeepSkyBlue	 LightSlateGray	 Pink
 Beige	 DimGray	 LightSlateGrey	 Plum
 Bisque	 DimGrey	 LightSteelBlue	 PowderBlue
 Black	 DodgerBlue	 LightYellow	 Purple
 BlanchedAlmond	 FireBrick	 Lime	 Red
 Blue	 FloralWhite	 LimeGreen	 RosyBrown
 BlueViolet	 ForestGreen	 Linen	 RoyalBlue
 Brown	 Fuchsia	 Magenta	 SaddleBrown
 BurlyWood	 Gainsboro	 Maroon	 Salmon
 CadetBlue	 GhostWhite	 MediumAquamarine	 SandyBrown
 Chartreuse	 Gold	 MediumBlue	 SeaGreen
 Chocolate	 Goldenrod	 MediumOrchid	 Seashell
 Coral	 Gray	 MediumPurple	 Sienna
 CornflowerBlue	 Grey	 MediumSeaGreen	 Silver
 Cornsilk	 Green	 MediumSlateBlue	 SkyBlue
 Crimson	 GreenYellow	 MediumSpringGreen	 SlateBlue
 Cyan	 Honeydew	 MediumTurquoise	 SlateGray
 DarkBlue	 HotPink	 MediumVioletRed	 SlateGrey
 DarkCyan	 IndianRed	 MidnightBlue	 Snow
 DarkGoldenrod	 Indigo	 MintCream	 SpringGreen
 DarkGray	 Ivory	 MistyRose	 SteelBlue
 DarkGreen	 Khaki	 Moccasin	 Tan
 DarkGrey	 Lavender	 NavajoWhite	 Teal
 DarkKhaki	 LavenderBlush	 Navy	 Thistle
 DarkMagenta	 LawnGreen	 OldLace	 Tomato
 DarkOliveGreen	 LemonChiffon	 Olive	 Turquoise
 DarkOrange	 LightBlue	 OliveDrab	 Violet
 DarkOrchid	 LightCoral	 Orange	 Wheat
 DarkRed	 LightCyan	 OrangeRed	 White
 DarkSalmon	 LightGoldenrodYellow	 Orchid	 WhiteSmoke
 DarkSeaGreen	 LightGray	 PaleGoldenrod	 Yellow
 DarkSlateBlue	 LightGreen	 PaleGreen	 YellowGreen
 DarkSlateGray	 LightGrey	 PaleTurquoise	

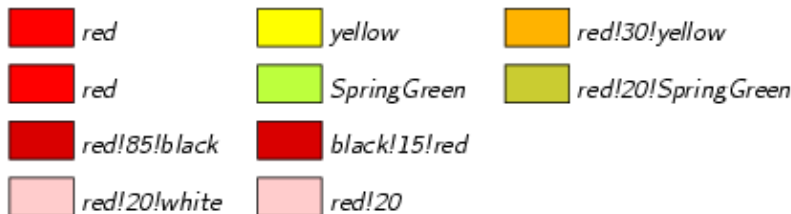
Named colors from the SVG package

A few of the SVG names are duplicates: *Aqua* = *Cyan*, *Fuchsia* = *Magenta*, *Gray* = *Grey*, *DarkGray* = *DarkGrey*, *LightGray* = *LightGrey*, *SlateGray* = *SlateGrey*, *DarkSlateGray* = *DarkSlateGrey*, *LightSlateGray* = *LightSlateGrey*, *DimGray* = *DimGrey*.

Blending colors

The `xcolor` package provides a means to mix any set of colors in desired proportions, just as you would mix colors in a paint store.

We specify a mix consisting of n percent from color A and $(100-n)$ percent from color B as $A!n!B$. The expression $A!n!B$ may be used wherever a color name is expected in Beamer. The expression $A!n$ is a shorthand for $A!n!white$. Here are a few samples. (Read each row from left to right.)



See the `xcolor` documentation for more details.¹⁰

Defining your own colors

In addition to the mechanisms described in the previous sections, you may define colors using the `\definecolor` command, as documented in the LaTeX manual and made available by loading the `color` package.¹¹

You specify a color by giving its RGB (Red Green Blue) components as decimal fractions in the interval 0 to 1 to `\definecolor`, as in:

```
\definecolor{mygold}{rgb}{0.85, 0.60, 0.00}
```

Then "mygold" may be used as any other color in LaTeX or Beamer. For instance:

This sentence is printed in "mygold".

This sentence is printed in "green!15!mygold".

See Colored text, highlights and boxes on how to use colors in your Beamer documents.

⁸ `Xcolor`'s author is Uwe Kern. See <http://www.ukern.de/tex/xcolor.html>.

A Beamer Quickstart

⁹ The file *svgnam.def* is distributed with `xcolor`.

¹⁰ On the department's machine you may view the documentation by doing:

```
gv /usr/local/share/texmf/doc/latex/xcolor/xcolor.PS &
```

¹¹ The `color` package is loaded by Beamer by default. You don't need to load it separately.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

25 Colored text, highlights and boxes

Colored text in Beamer is produced using the standard LaTeX `\textcolor` command, as in:

```
\textcolor{blue}{This text is in blue}
```

This text is in blue

Remark: The command `\structure{This is a colored text}` may be used to draw the specified text in the presentation's *structure color*. See [Direct use of the structure color](#) for details.

Text background color is set using the `\colorbox` command:

```
\colorbox{yellow}{This text is highlighted in yellow}
```

This text is highlighted in yellow

You may combine various color and font elements to achieve interesting results. For example:

```
\colorbox{yellow}{  
  \textcolor{red}{  
    \textbf{  
      Bold text in red, highlighted in yellow  
    }  
  }  
}
```

Bold text in red, highlighted in yellow

To enclose text in a bordered box:

```
\fcolorbox{red}{yellow}{A yellow box with red border}
```

A yellow box with red border

The border's thickness is controled by the LaTeX variable `\fboxrule`. Let's set the border's thickness to 4 points:

```
\setlength{\fboxrule}{4pt}  
\fcolorbox{red}{white}{A white box with a red border of thickness 4 points}
```

A white box with a red border of thickness 4 points

The separation between the border and the enclosed object is controled by the LaTeX variable `\fboxsep`. Let's set the separation to zero:

```
\setlength{\fboxrule}{4pt}  
\setlength{\fboxsep}{0pt}
```

A Beamer Quickstart

```
\fcolorbox{red}{white}{A white box with a red border and separation of 0 points}
```

A white box with a red border and separation of 0 points

Also see [UMBC boxes](#) for fancier boxes that may contain text or math.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

26 Setting a slide's background

The background color of a Beamer slide is white by default. In the following example I will describe a few ways to change the default background.

Setting the background to a solid color

This example shows how to set the background to a light shade of pink:

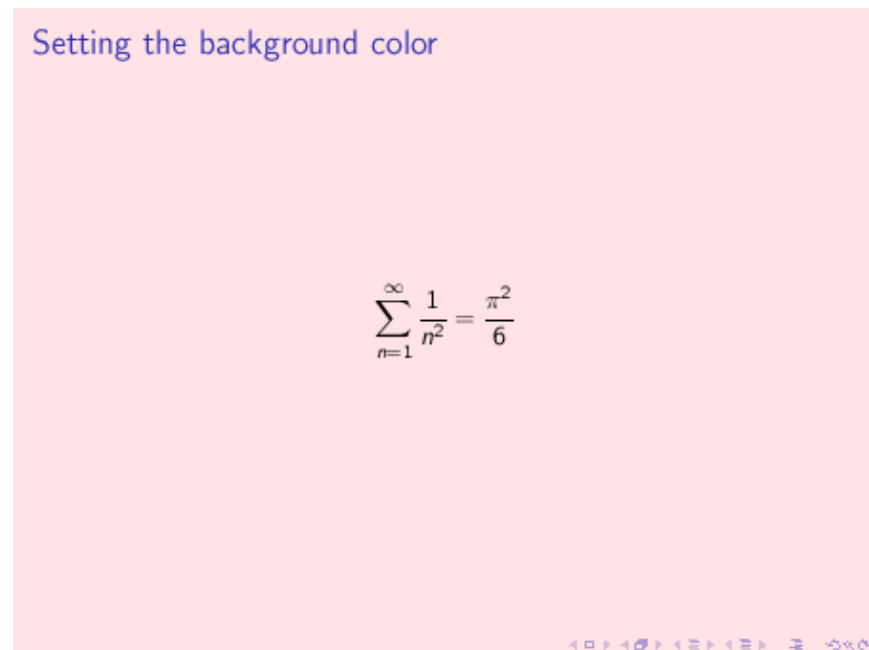
```
% backgrounds-demo1.tex
\documentclass{beamer}
\usetheme{default}
\setbeamercolor{normal text}{bg=red!12}
\begin{document}

\begin{frame}
  \frametitle{Setting the background color}

  \[
    \sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}
  \]

\end{frame}

\end{document}
```



See the section [Blending Colors](#) for the meaning of the color specification `red!12`.

Gradient colors in the background

Gradually shaded backgrounds are possible as well. In the following example, the background varies from light red at the bottom to light yellow at the top.

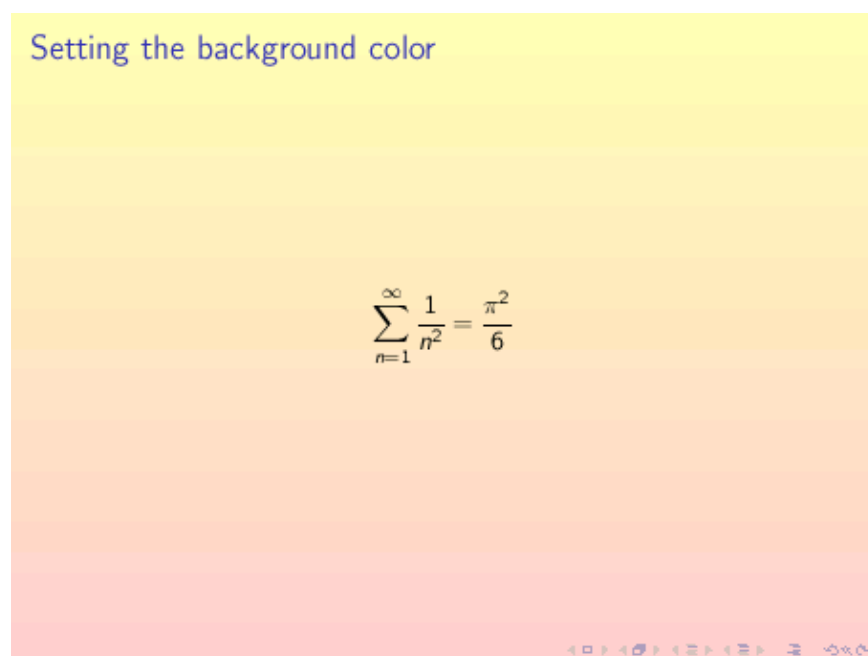
```
% backgrounds-demo2.tex
\documentclass{beamer}
\usetheme{default}
\setbeamertemplate{background canvas}[vertical shading][bottom=red!20,top=yellow!30]
\begin{document}

\begin{frame}
  \frametitle{Setting the background color}

  \[
    \sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}
  \]

\end{frame}

\end{document}
```



Grid superimposed on background

An interesting effect may be achieved by superimposing a grid on the background:

```
% backgrounds-demo3.tex
\documentclass{beamer}
\usetheme{default}
\setbeamertemplate{background canvas}[vertical shading][bottom=red!20,top=yellow!30]
\setbeamertemplate{background}[grid][step=5mm,color=blue]
\begin{document}

\begin{frame}
```

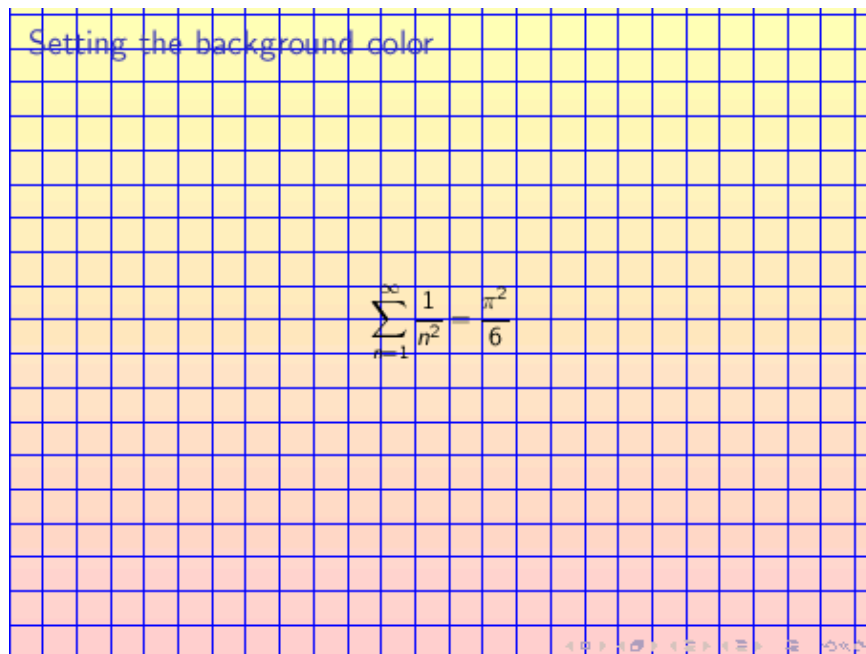
A Beamer Quickstart

```
\frametitle{Setting the background color}

\[
\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}
\]

\end{frame}

\end{document}
```



An image for a background

The following example shows how to fill the background of a Beamer slide with the scaled version of an image using the command:¹²

```
\setbeamertemplate{background canvas}{...}
```

Note how I have changed the structure color and the default font color to achieve a reasonable contrast between text and background.

```
% backgrounds-demo4.tex
\documentclass[12pt]{beamer}
\usetheme{default}
\setbeamercolor{structure}{fg=green!30}
\setbeamercolor{normal text}{fg=green!30}
\setbeamertemplate{background canvas}{\includegraphics
[width=\paperwidth,height=\paperheight]{alps.jpg}}
\begin{document}

\begin{frame}[t]
\frametitle{Skiing in the Alps}

\begin{itemize}
```

A Beamer Quickstart

```
\item Check equipment
\item Wear warm clothes
\item Pack first-aid kit
\item Good luck!
\end{itemize}

\end{frame}

\end{document}
```



Remark: The image file *alps.jpg* is not a part of Beamer; you need to supply an image of your own.

Remark: The aspect ratio of a Beamer slide is 4:3 therefore it's best if your background image has the same aspect ratio. Otherwise your image will be distorted when it's stretched to cover the slide from edge to edge.

Remark: To limit the background setting to a single slide, enclose the `\setbeamertemplate{background canvas}{...}` command in braces, as in:

```
{ % brace to limit the scope of \setbeamertemplate
\setbeamertemplate{navigation symbols}{} % optionally hide navigation buttons
\setbeamertemplate{background canvas}{\includegraphics
    [width=\paperwidth,height=\paperheight]{alps.jpg}}
\begin{frame}[plain]
...
\end{frame}
} % closing brace
```

The `[plain]` option to `\begin{frame}` suppresses the drawing of any decorations that may be associated with the current theme.

Remark: Fancy background colors, shading and pictures may make your slides look pretty but they may also be distracting. Use your judgement to see if such devices are appropriate for your presentation.

¹² I am indebted to *Syed Irfan* for correcting an earlier version of this document where I had "background" instead of "background canvas" in several places in this section.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

27 Acrobat Reader usage

Acrobat Reader usage under Linux

To use the Acrobat Reader to display the pdf file *small.pdf* on on your computer screen, do:

```
acroread small.pdf
```

On startup, the Acrobat Reader probably will display your slides in a small window for previewing.

- To expand the slide to fill the entire screen, press **Control-L**.
- To get out of the full-screen mode, press **Control-L** again.

Once in the full-screen mode, navigate among your slides using the following key bindings:

Next slide	Right Arrow
Previous slide	Left Arrow
Last slide	Control-Shift-PageDown
First slide	Control-Shift-PageUp
Previous viewed slide	Control-Left Arrow
Quit	Control-Q

The "Previous viewed slide" requires some explanation.

Suppose that you jump to the last slide by **Control-Shift-PageDown**. Then **Control-Left Arrow** will return you to the slide from which you jumped, because that is the "Previous viewed slide".

Additionally, in [Navigating with hyperlinks](#) we will see how to make out-of-sequence jumps from one slide to another, using hyperlinks. There, too, the **Control-Left Arrow** will be used to return to the "Previous viewed slide".

Remark: A very readable documentation of Acrobat Reader's features is available in its on-line help, accessible through the **Help** button on Acrobat Reader's menu bar.

Acrobat Reader usage on other systems

Acrobat Reader's key bindings may vary, depending on the operating systems.

I have not much experience with anything other than Linux therefore I cannot provide useful advice for other systems. Nevertheless, I have been told that under Windows the key for "Previous viewed slide" is **Alt-Left Arrow**. You may want to make note of that.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

28 Xpdf usage

Xpdf is a pretty good alternative to Adobe's Acrobat Reader. It has at least two advantages over Acrobat Reader:

- It is particularly lightweight -- it starts up noticeably faster -- therefore repeated invocations are pretty painless.
- It can re-load the current document. This is very useful during the development of Beamer slides. You can start up Xpdf on your document and put it in the background. Then as you edit your source file and update the resulting pdf file, you can update the display by typing "r" key in the Xpdf window. No need to exit and restart.

Xpdf's disadvantages are:

- It is limited to platforms with the X Window System, It does not run on Microsoft Windows. Therefore it is not as widely available as Adobe's Acrobat Reader. You just can't expect to walk up to a computer in a conference and expect to find Xpdf installed on it.
- It is not possible to toggle between window mode and the full-screen mode in Xpdf. For full-screen mode, you need to start Xpdf with the `-fullscreen` option. See below for details.
- There are some rough edges, literally, in certain elements displayed by Xpdf. Generally Adobe's Acrobat Reader produces a nicer looking output.

For these reasons, I use Xpdf while building a presentation and use the Acrobat Reader for presenting my slides to an audience.

Running Xpdf inside a window

To display the file `small.pdf`, do:

```
xpdf small.pdf
```

Navigate among your slides using the following key bindings:

Next slide	n or SpaceBar or PageDown
Previous slide	p or BackSpace or PageUp
Last slide	Control-End
First slide	Control-Home
Previous viewed slide	b
Re-load file	r
Quit	q

Remark: The "Previous viewed slide" was explained in the [Acrobat Reader usage](#).

Remark: To get a complete list of Xpdf's key binding, click the question-mark button that appears along Xpdf window's bottom edge.

Running Xpdf in the full-screen mode

To display the file `small.pdf` in the full-screen mode, do:

```
xpdf -fullscreen small.pdf
```

Navigate among the slides with the same key binding that were described in the previous paragraph.

Advanced usage

Start up Xpdf with a command like `"xpdf small.pdf"` then resize the window using whatever hooks your window manager provides.

You will find out that the contents of the window remain at the original size -- they do not resize along with the window.

To tell Xpdf to resize the contents along with the window, invoke it as:

```
xpdf -z page small.pdf
```

This is pretty handy while you are developing your slides: you can use your window manager's "maximize" function to toggle between normal and maximized states to get a better view of the slides.

I see no reason for not using the `-z page` flag all of the time. Therefore I have aliased `xpdf` to `"xpdf -z page"` and I recommend that you do it too. How you define an alias depends on the unix shell that you use. At UMBC's Department of Mathematics and Statistics we use `tcsh`. Therefore edit the file `.cshrc` in your home directory and add the following line to it:

```
alias xpdf xpdf -z page
```

While you are editing your `.cshrc`, you might as well add the following lines:

```
alias xpdff xpdf -fullscreen
complete xpdff 'n/*/f:*. {pdf,PDF}/'
```

The first of these lines sets `xpdff` to be an alias for `"pdf -fullscreen"`, therefore you can now start a full-screen presentation by typing `"xpdff small.pdf"`.

The second line tells `tcsh` that the newly created `xpdff` command expects file names ending in `pdf` or `PDF`. This is used when you hit the `TAB` key to complete a file name on the command line.

Where to get Xpdf

Xpdf is bundled with most Linux distributions. If for some reason you need to download, compile and install the package yourself, you can get the source from: <http://www.foolabs.com/xpdf/>.

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

29 Beamer on the Web

Beamer's home on the web

Beamer's author is Till Tantau. Beamer's home page on the Web is at:

<http://latex-beamer.sourceforge.net/>

where you can find several substantive examples plus downloading and installation instructions.

Screenshots

Jason Gorski has created a very nice set of Beamer screenshots in:

<http://www.csd.uwo.ca/gradstudents/jgorski/personal/beamerthemes/>

It shows the complete set of Beamer themes, without customization.

A very brief introduction

Norm Matloff at UC Davis has produced a very brief introduction to Beamer. This may be useful if you want to get started in a hurry.

<http://heather.cs.ucdavis.edu/matloff/beamer.html>

Advanced tutorials

Ki-Joo Kim has created two very nice tutorials that demonstrate many advanced features of Beamer. You can find these tutorials, named *beamer_guide.pdf* and *beamer_pstricks.pdf* in:

<http://www.geocities.com/kijoo2000/beamer.html>

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

30 A gallery of Beamer slides

In this page I have included samples of slides produced by Beamer. The contents of these slides are identical to that of the file `sample.tex`. Only the controlling commands in the preamble are changed. Above each slide I have shown the complete preamble material that has gone into making that slide.

```
\documentclass{beamer}
\usetheme{default}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |



```
\documentclass{beamer}
\usetheme{default}
\useoutertheme{umbcfootline}
\useinnertheme{umbctribullets}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

A Beamer Quickstart

```
\documentclass{beamer}
\usetheme{default}
\useoutertheme{umbcfootline}
\setbeamertemplate{background canvas}[vertical shading][bottom=red!20,top=yellow!30]
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

R. Rindler-Schjerve, UBC

A short proof, ECTS

1/3

```
\documentclass[xcolor=svgnames]{beamer}
\setbeamercolor{normal text}{bg=MediumSlateBlue,fg=white}
\usecolortheme[named=white]{structure}
\usetheme{default}
\useoutertheme{umbcfootline}
\useinnertheme{umbctribullets}
\umbctribulletscolors{orange}{green}{yellow}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

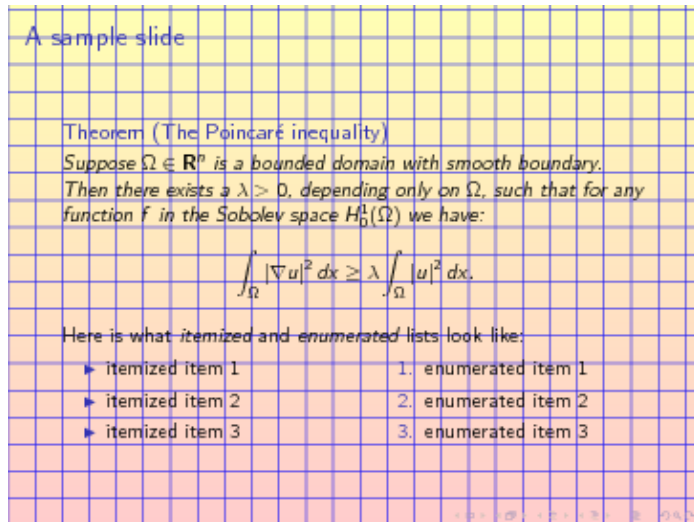
- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

R. Rindler-Schjerve, UBC

A short proof, ECTS

1/3

```
\documentclass{beamer}
\usetheme{default}
\setbeamertemplate{background canvas}[vertical shading][bottom=red!20,top=yellow!30]
\setbeamertemplate{background}[grid][step=5mm,color=blue]
```

```
\documentclass[12pt]{beamer}
\usetheme{default}
\setbeamercolor{structure}{fg=cyan!70}
\setbeamercolor{normal text}{fg=cyan!70} % Note: sunset.jpg is not a part of beamer; you need to
\setbeamertemplate{background}{\includegraphics[width=\paperwidth]{sunset.jpg}}
```



```
\documentclass{beamer}
\usetheme{Boadilla}
```

A sample slide

Theorem (The Poincaré inequality)
 Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

• itemized item 1	① enumerated item 1
• itemized item 2	② enumerated item 2
• itemized item 3	③ enumerated item 3

R. Rossman (LMBC) A short proof November 2004 1 / 1

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Maroon]{structure}
\usetheme{Boadilla}
```

A sample slide

Theorem (The Poincaré inequality)
 Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

• itemized item 1	① enumerated item 1
• itemized item 2	② enumerated item 2
• itemized item 3	③ enumerated item 3

R. Rossman (LMBC) A short proof November 2004 1 / 1

```
\documentclass{beamer}
\usetheme{Madrid}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ■ itemized item 1 | ① enumerated item 1 |
| ● itemized item 2 | ② enumerated item 2 |
| ■ itemized item 3 | ③ enumerated item 3 |

```
\documentclass[xcolor=dvipsnames]{beamer}
\setbeamercolor{structure}{fg=OliveGreen!50!black}
\usetheme{Madrid}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ■ itemized item 1 | ① enumerated item 1 |
| ● itemized item 2 | ② enumerated item 2 |
| ■ itemized item 3 | ③ enumerated item 3 |

```
\documentclass{beamer}
\usetheme{Pittsburgh}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| • itemized item 1 | ① enumerated item 1 |
| • itemized item 2 | ② enumerated item 2 |
| • itemized item 3 | ③ enumerated item 3 |

Navigation icons: back, forward, search, etc.

```
\documentclass{beamer}
\usetheme[height=7mm]{Rochester}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ■ itemized item 1 | ① enumerated item 1 |
| ■ itemized item 2 | ② enumerated item 2 |
| ■ itemized item 3 | ③ enumerated item 3 |

Navigation icons: back, forward, search, etc.

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=OliveGreen]{structure}
\usetheme[height=7mm]{Rochester}
\setbeamertemplate{items}{ball}
\setbeamertemplate{blocks}[rounded][shadow=true]
\useoutertheme{umbcfootline}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ● itemized item 1 | ➊ enumerated item 1 |
| ● itemized item 2 | ➋ enumerated item 2 |
| ● itemized item 3 | ➌ enumerated item 3 |

R. Rostamian, UCB

A short proof, Cern.

1/1

```
\documentclass{beamer}
\usetheme{Copenhagen}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ● itemized item 1 | ➊ enumerated item 1 |
| ● itemized item 2 | ➋ enumerated item 2 |
| ● itemized item 3 | ➌ enumerated item 3 |

R. Rostamian

A short proof

```
\documentclass{beamer}
\usetheme{Warsaw}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| • itemized item 1 | 1. enumerated item 1 |
| • itemized item 2 | 2. enumerated item 2 |
| • itemized item 3 | 3. enumerated item 3 |



```
\documentclass{beamer}
\usetheme{Singapore}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| • itemized item 1 | 1. enumerated item 1 |
| • itemized item 2 | 2. enumerated item 2 |
| • itemized item 3 | 3. enumerated item 3 |



```
\documentclass{beamer}
\usetheme{Malmoe}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
 Then there exists a $\lambda > 0$, depending only on Ω , such that for any
 function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ► itemized item 1 | 1. enumerated item 1 |
| ► itemized item 2 | 2. enumerated item 2 |
| ► itemized item 3 | 3. enumerated item 3 |



```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Brown]{structure}
\usetheme{Malmoe}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbf{R}^n$ is a bounded domain with smooth boundary.
 Then there exists a $\lambda > 0$, depending only on Ω , such that for any
 function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ► itemized item 1 | 1. enumerated item 1 |
| ► itemized item 2 | 2. enumerated item 2 |
| ► itemized item 3 | 3. enumerated item 3 |



```
\documentclass{beamer}
\usetheme{umbcl}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
 Then there exists a $\lambda > 0$, depending only on Ω , such that for any
 function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ► itemized item 1 | 1. enumerated item 1 |
| ► itemized item 2 | 2. enumerated item 2 |
| ► itemized item 3 | 3. enumerated item 3 |

R. Raskar, UBC

A short proof, Eves.

1/3

```
\documentclass[xcolor=dvipsnames]{beamer}
\usecolortheme[named=Sepia]{structure}
\usetheme{umbc1}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
 Then there exists a $\lambda > 0$, depending only on Ω , such that for any
 function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ► itemized item 1 | 1. enumerated item 1 |
| ► itemized item 2 | 2. enumerated item 2 |
| ► itemized item 3 | 3. enumerated item 3 |

R. Raskar, UBC

A short proof, Eves.

1/3

```
\documentclass{beamer}
\usetheme{umbc2}
```


A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
 Then there exists a $\lambda > 0$, depending only on Ω , such that for any
 function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ● itemized item 1 | ❶ enumerated item 1 |
| ● itemized item 2 | ❷ enumerated item 2 |
| ● itemized item 3 | ❸ enumerated item 3 |

R. Raskar, UBC

A short proof, Gromov

1/3

```
\documentclass{beamer}
\usecolortheme[named=violet]{structure}
\usetheme{umbc2}
```

A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary.
 Then there exists a $\lambda > 0$, depending only on Ω , such that for any
 function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|---------------------|
| ● itemized item 1 | ❶ enumerated item 1 |
| ● itemized item 2 | ❷ enumerated item 2 |
| ● itemized item 3 | ❸ enumerated item 3 |

R. Raskar, UBC

A short proof, Gromov

1/3

```
\documentclass{beamer}
\usetheme{umbc3}
```



A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| • itemized item 1 | 1. enumerated item 1 |
| • itemized item 2 | 2. enumerated item 2 |
| • itemized item 3 | 3. enumerated item 3 |

R. Maier, UTMBC

A short presentation

2/2

```
\documentclass{beamer}
\usetheme{umbc4}
```



A sample slide

Theorem (The Poincaré inequality)

Suppose $\Omega \in \mathbb{R}^n$ is a bounded domain with smooth boundary. Then there exists a $\lambda > 0$, depending only on Ω , such that for any function f in the Sobolev space $H_0^1(\Omega)$ we have:

$$\int_{\Omega} |\nabla u|^2 dx \geq \lambda \int_{\Omega} |u|^2 dx.$$

Here is what *itemized* and *enumerated* lists look like:

- | | |
|-------------------|----------------------|
| ▶ itemized item 1 | 1. enumerated item 1 |
| ▶ itemized item 2 | 2. enumerated item 2 |
| ▶ itemized item 3 | 3. enumerated item 3 |

R. Maier, UTMBC

A short presentation

2/2

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

31 Complete set of Beamer themes

This page contains samples corresponding to *every* theme distributed with version 3.06 of Beamer. Each theme is represented as a pair of images—one titlepage and one ordinary slide. The idea of such a web page came from an old website of *Jason Gorski*. That website no more exists, hence this replacement.

The samples were generated according to the following template:

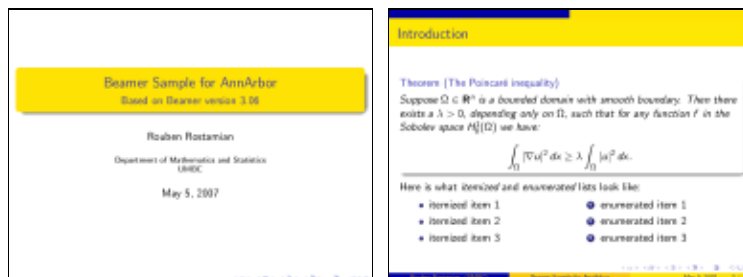
```
\documentclass{beamer}
\usetheme{@THEME} % name of theme substituted here
\begin{document}
\title{Beamer Sample for @THEME}
\subtitle{Based on Beamer version 3.06}
\author{Rouben Rostamian}
\institute[UMBC]{Department of Mathematics and Statistics\UMBC}
\date{\today}

\begin{frame}[plain]
  \titlepage\end{frame}

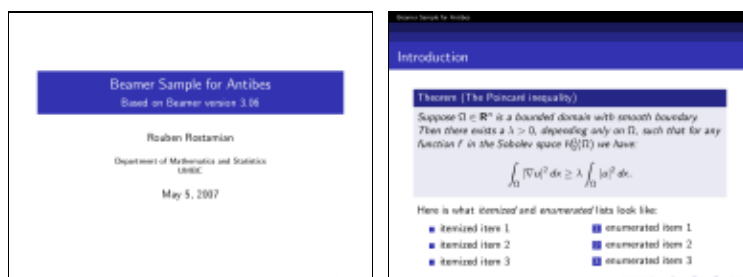
\begin{frame}
  \frametitle{Introduction}
  ...
\end{frame}
\end{document}
```

Click on any image to see a larger version of it.

Beamer theme AnnArbor



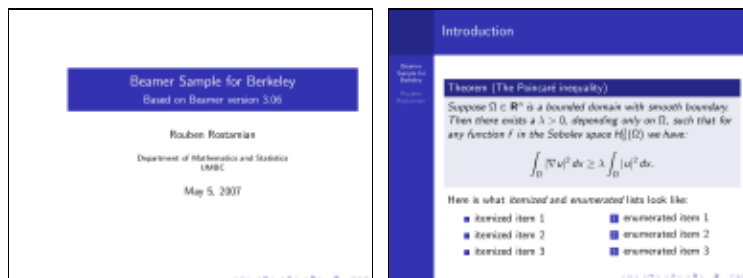
Beamer theme Antibes



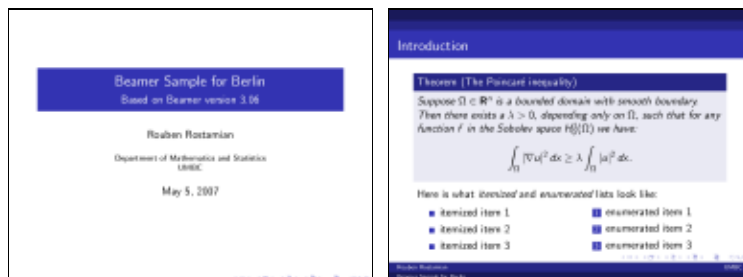
Beamer theme Bergen



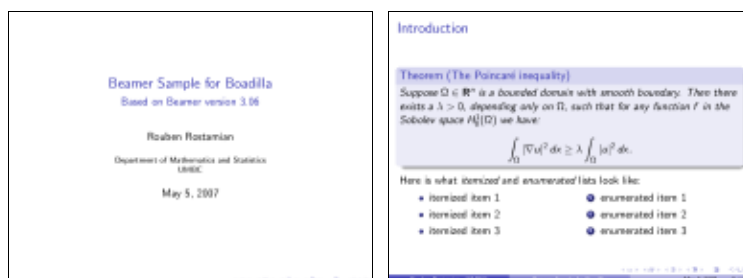
Beamer theme Berkeley



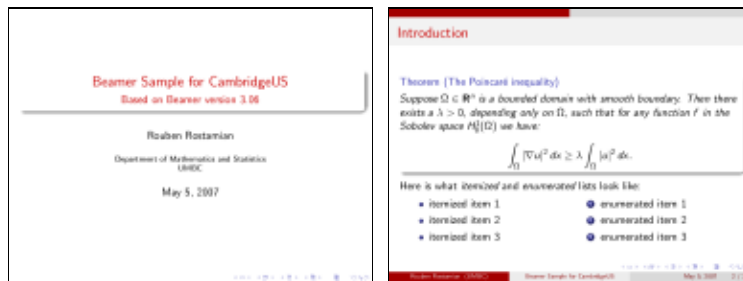
Beamer theme Berlin



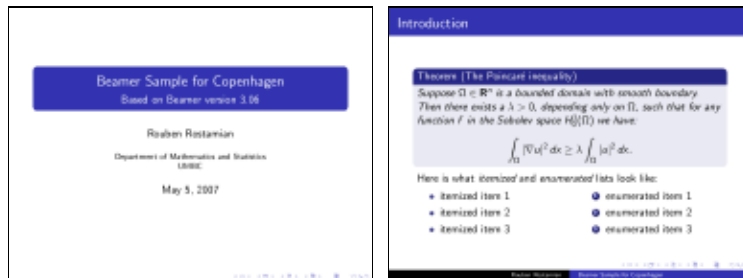
Beamer theme Boadilla



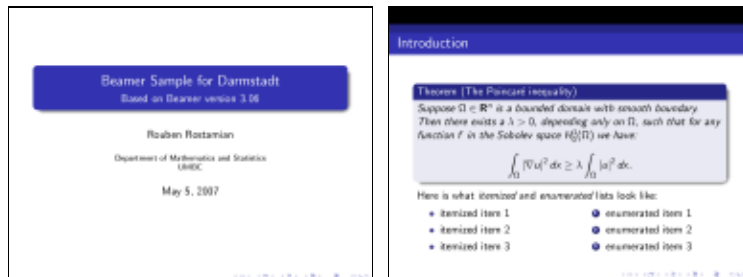
Beamer theme CambridgeUS



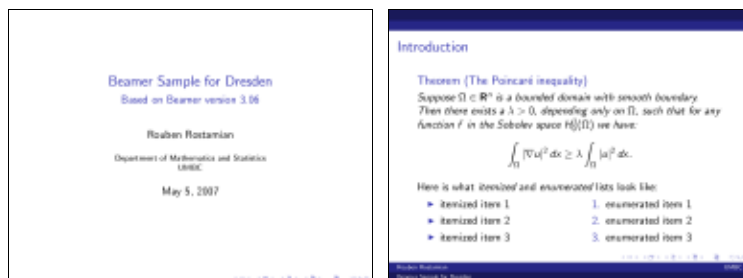
Beamer theme Copenhagen



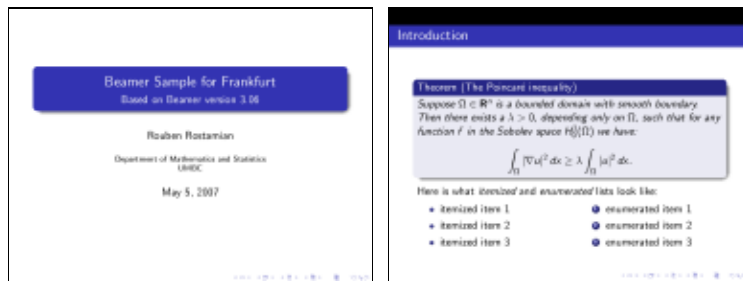
Beamer theme Darmstadt



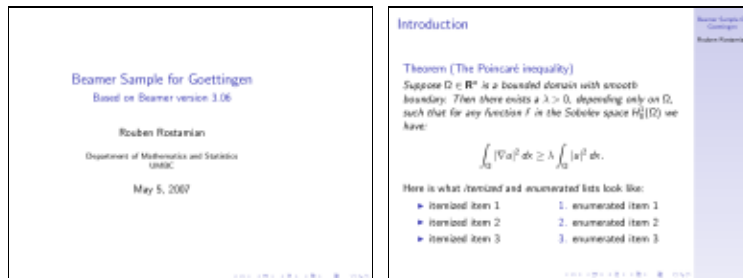
Beamer theme Dresden



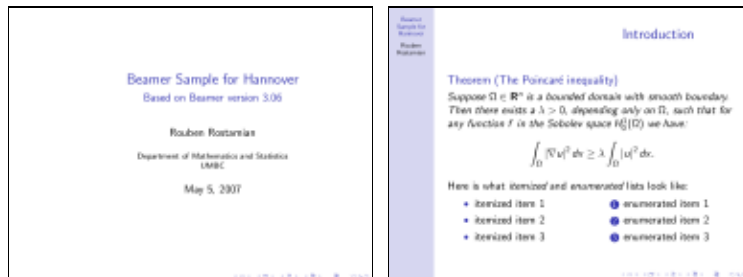
Beamer theme Frankfurt



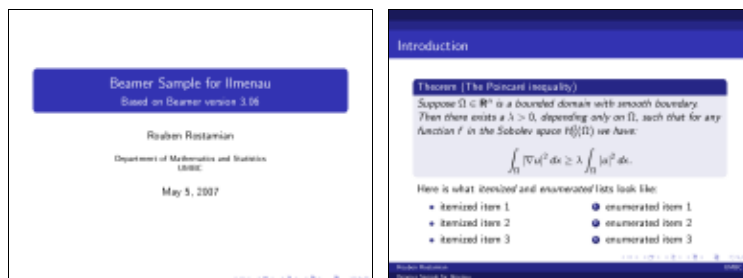
Beamer theme Goettingen



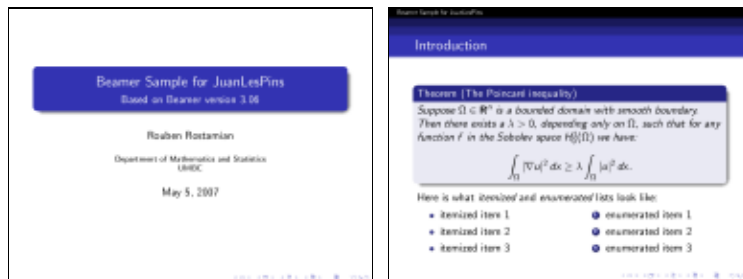
Beamer theme Hannover



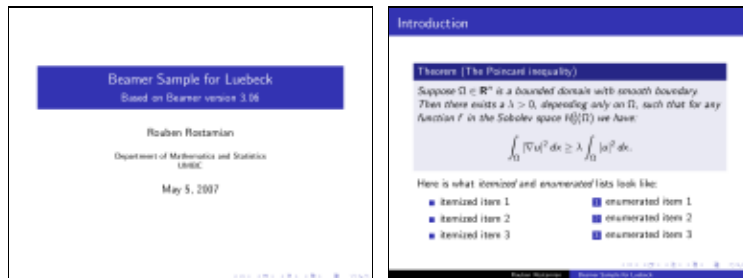
Beamer theme Ilmenau



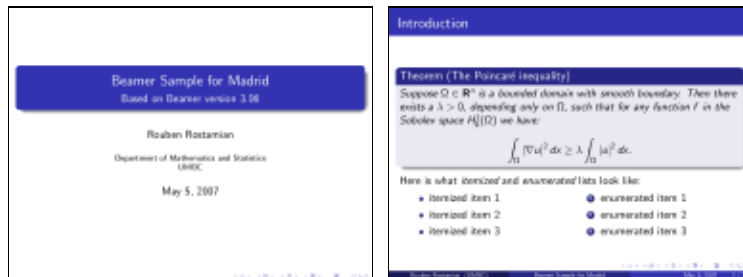
Beamer theme JuanLesPins



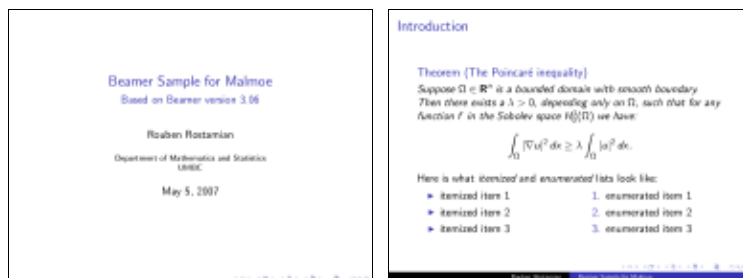
Beamer theme Luebeck



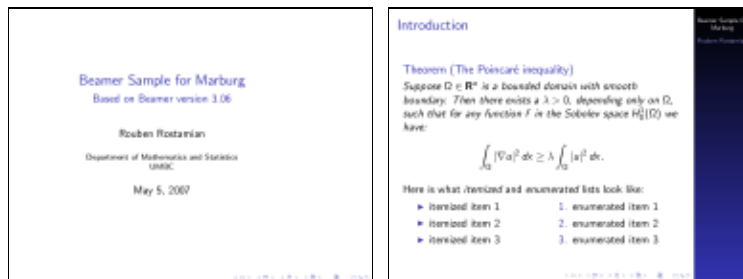
Beamer theme Madrid



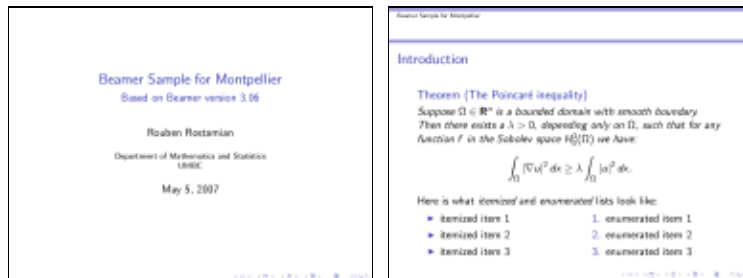
Beamer theme Malmoe



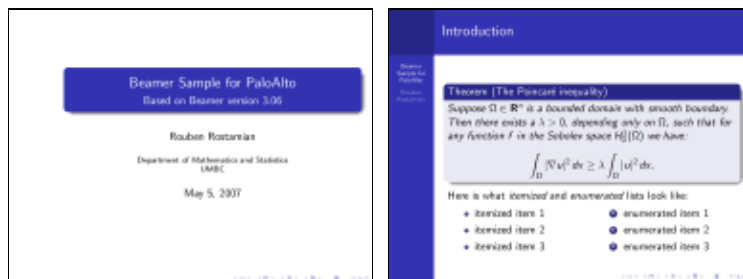
Beamer theme Marburg



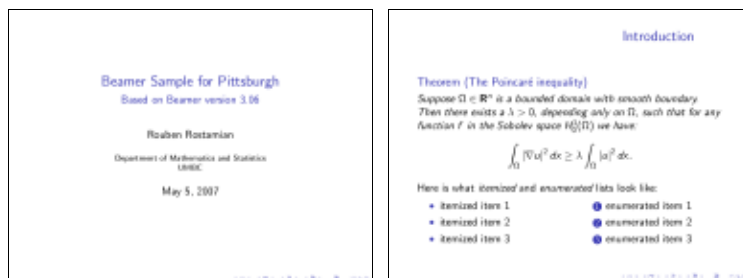
Beamer theme Montpellier



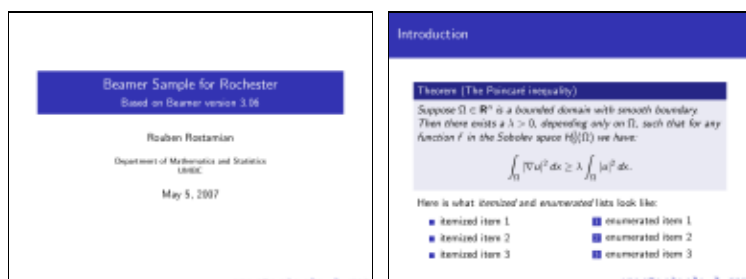
Beamer theme PaloAlto



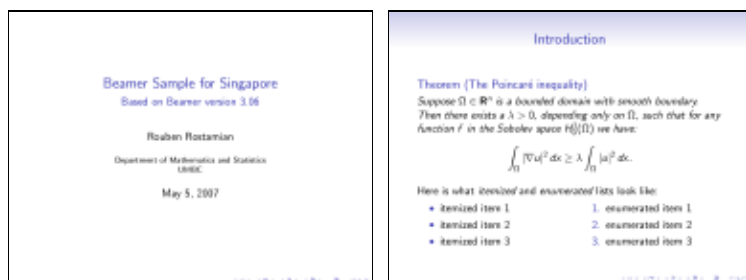
Beamer theme Pittsburgh



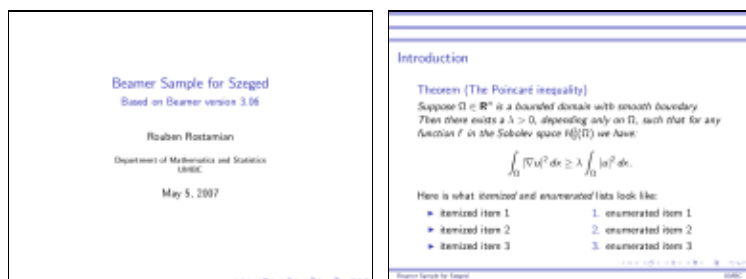
Beamer theme Rochester



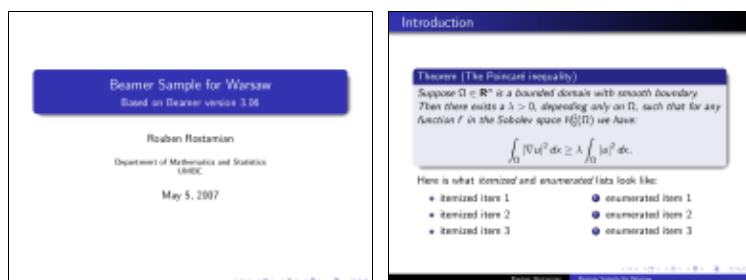
Beamer theme Singapore



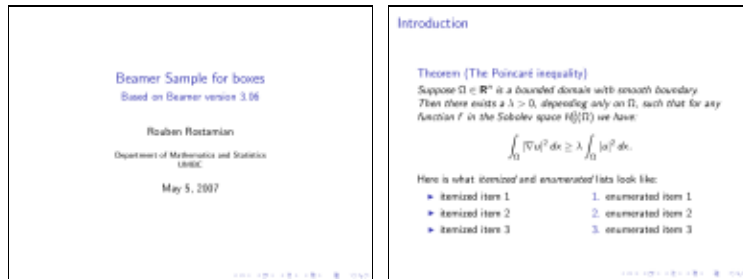
Beamer theme Szeged



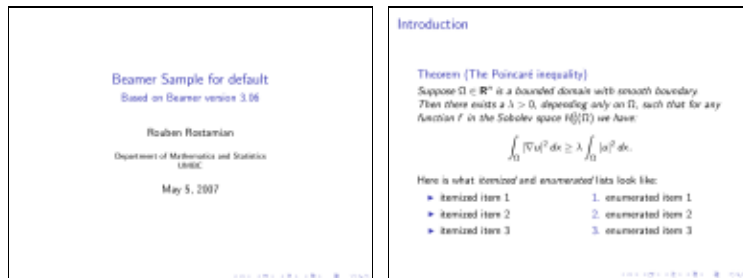
Beamer theme Warsaw



Beamer theme boxes



Beamer theme default



[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)

Index

Adobe's Acrobat Reader

key bindings

background color, gradual shading, grid pattern, image

bare-bones example, small.tex

beamer on the web

boxed text

bug in fonttheme

bug in infolines

bullets: ball, circle, rectangle, triangle

color selector tool: xcolorsel

color, normal text

\colorbox

colored text

colors

blending

defining with RGB components

named colors:

beamer's defaults

extended set from the dvips package

extended set from the svg package

the xcolor package

columns environment

compiling into pdf

convert

dimensions of a beamer slide

displaybox environment, *see* UMBC add-ons to Beamer

downloadg_hfc.tgz

epstopdf

\fboxrule

\fboxsep

\fcolorbox

fonts

sizes

themes

footline, *see* UMBC add-ons to Beamer

the infolines theme

[umbc footline](#)
[frame, same as slide](#)

[gallery](#)
 [demos](#)
 [standard themes](#)
[graphics](#)
 [format conversion](#)
 [including images in slides](#)

[height option in the Rochester theme](#)
[hfc.tgz](#)
[highlighted text](#)
[hyperlinks](#)
 [buttons](#)
 [returning to calling page](#)

ImageMagick, *see* [convert](#)
[\includegraphics](#)
[itemization markers: ball, circle, rectangle, triangle](#)

[long example](#)

[margins, customizing widths](#)

[navigating with hyperlinks](#)
[navigation icons, getting rid of](#)

onlinebox environment, *see* [UMBC add-ons to Beamer](#)
[overlays](#)

[pause](#)
[pdflatex](#)

[rounded boxes and shadows](#)

[shrink to make things fit](#)
[slide, same as frame](#)
[small.tex](#)
[structure color](#)
 [coloring text with the \structure command](#)

[specifying RGB colors](#)
[specifying rgb colors](#)

[tar command](#)

[tex2page](#)

[text color](#)

[\textcolor](#)

[themes](#)

[customizing](#)

[directory](#)

[inner, outer](#)

[more interesting](#)

[theorems and related environemnts: definition, corollary, theorem, example, proof](#)

[title page](#)

[author, title, subtitle, institute, date](#)

[short author, short title, etc.](#)

[the plain option](#)

UMBC add-ons to Beamer

[downloading](#)

[tribullets, an inner theme for triangular itemization markers](#)

[umbc1, umbc2, umbc3, umbc4: basic beamer themes](#)

[umbc1, umbc2, umbc4: basic beamer themes](#)

[customizing](#)

[umbcboxes, an inner theme for boxed text/math](#)

[umbcfootline, an outer theme for slide footlines](#)

[changing per slide](#)

[customizing](#)

[unpacking a tar archive](#)

[vertical alignment within slides](#)

[xcolor package](#)

[xcolorsel](#)

[xpdf](#)

[aliases for unix](#)

[full-screen mode](#)

[key bindings](#)

[\[contents\]](#) [\[index\]](#) [\[previous\]](#) [\[next\]](#)