Beamer By Example
Subtitle: Frankfurt Theme

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University of Somewhere

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Conference on Tasteful Presentations, 2008
Outline

1 Structure
   • Features
   • Processing
   • Basics
   • Colour
Outline

1 Structure
   - Features
   - Processing
   - Basics
   - Colour

2 Lists
   - Uncovering Text
   - Theorems/Proofs
   - Handouts
Outline

1. Structure
   - Features
   - Processing
   - Basics
   - Colour

2. Lists
   - Uncovering Text
   - Theorems/Proofs
   - Handouts

3. Fancy Bits
   - Columns
   - pstricks package
   - Movies
Outline

1. Structure
   * Features
     - Processing
     - Basics
     - Colour

2. Lists
   * Uncovering Text
   * Theorems/Proofs
   * Handouts

3. Fancy Bits
   * Columns
   * pstricks package
   * Movies
Beamer
Features

Written by Till Tantau while completing his PhD.

- Process with either `pdflatex` or `latex+dvips`
Beamer
Features

Written by Till Tantau while completing his PhD.

- Process with either `pdflatex` or `latex+dvips`
- Standard \LaTeX{} commands still work
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- Process with either `pdflatex` or `latex+dvips`
- Standard \LaTeX commands still work
- `tableofcontents` works
Written by Till Tantau while completing his PhD.

- Process with either `pdflatex` or `latex+dvips`
- Standard LaTeX commands still work
- `tableofcontents` works
- Overlays & dynamic effects easily created
Beamer
Features

Written by Till Tantau while completing his PhD.

- Process with either \texttt{pdflatex} or \texttt{latex+dvips}
- Standard \LaTeX\ commands still work
- \texttt{tableofcontents} works
- Overlays \& dynamic effects easily created
- Easy navigation through sections \& subsections
Beamer
Features

Written by Till Tantau while completing his PhD.

- Process with either `pdflatex` or `latex+dvips`
- Standard \LaTeX\ commands still work
- `tableofcontents` works
- Overlays & dynamic effects easily created
- Easy navigation through sections & subsections
- Many templates and examples included in package
Written by Till Tantau while completing his PhD.

- Process with either `pdflatex` or `latex+dvips`
- Standard `\LaTeX` commands still work
- `tableofcontents` works
- Overlays & dynamic effects easily created
- Easy navigation through sections & subsections
- Many templates and examples included in package
- `article` style can be used to produce notes
Outline

1. **Structure**
   - Features
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   - Basics
   - Colour

2. **Lists**
   - Uncovering Text
   - Theorems/Proofs
   - Handouts

3. **Fancy Bits**
   - Columns
   - pstricks package
   - Movies
This document was processed with

- \textit{latex}
Processing

This document was processed with

- `latex`
- `dvips`
This document was processed with

- `latex` then
- `dvips` and
- `ps2pdf`

so as to allow use of the package `pstricks`. 
Processing

This document was processed with
  - `latex` then
  - `dvips` and
  - `ps2pdf`
so as to allow use of the package `pstricks`.
This means that all graphics have to be `eps` files.
Processing

This document was processed with

- \texttt{latex} then
- \texttt{dvips} and
- \texttt{ps2pdf}

so as to allow use of the package \texttt{pstricks}.
This means that all graphics have to be \texttt{eps} files.
If processing fails, try deleting all \texttt{aux} files.
This document was processed with

- \texttt{latex} then
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so as to allow use of the package \texttt{pstricks}.

This means that all graphics have to be \texttt{eps} files.

If processing fails, try deleting all \texttt{aux} files.

The alternative is to use \texttt{pdflatex} & pdf or jpg graphics.
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Sample Code

\documentclass{beamer}
\usetheme{Frankfurt}

Use \section{..} and \subsection{..} to create items for the Table of Contents

The code for a frame is ...

\subsection{Basics}
\begin{frame}
   \frametitle{Sample Code}
   Frame content

\end{frame}
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This a 2–stage process

- Define the colour

\setbeamercolor{blue}{fg=blue!50}
Colouring Text

This a 2–stage process

- **Define the colour**
  \setbeamercolor{blue}{fg=blue!50}

- **Use the colour**
  \usebeamercolor{fg}{blue} Some blue text

Some blue text
This a 2–stage process

- **Define the colour**

  \setbeamercolor{blue}{fg=blue!50}

  
  - **Use the colour**

    \{\usebeamercolor[fg]{blue}\} Some blue text

    Some blue text

- or

  \newcommand{\green}[1]{\usebeamercolor[fg]{green}#1}

  \green{some green text}....\textcolor{green}{some green text}

  \alert<4>{Colours predefined in \texttt{PSTRICKS}}
This a 2–stage process

- **Define the colour**
  \[ \texttt{\setbeamercolor{blue}{fg=blue!50}} \]

- **Use the colour**
  \[ \texttt{\usebeamercolor[fg]{blue}\Some\blue\text{\textit{blue\ text}}} \]

  Some blue text

- **or**
  \[ \texttt{\newcommand{\green}[1]{\usebeamercolor[fg]{green}#1}} \]
  \[ \texttt{\green{\text{\textit{some\ green\ text}}}....\textbf{\textcolor{green}{some\ green\ text}}} \]

\[ \texttt{\alert<4>{Colours\ predefined\ in\ PSTRICKS}} \]
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Uncovering Text
Subtitle: A Short Example

- Use \textbf{itemize} a lot–with \texttt{\textbackslash pause}
Uncovering Text
Subtitle: A Short Example

- Use `itemize` a lot—with `\pause`
- Use very short sentences or short phrases.

\begin{itemize}
\item Use `\texttt{itemize}` a lot—with `\pause`
\item Use very short sentences or short phrases.
\end{itemize}
You can create overlays...

- using the \texttt{\textbackslash pause} command:
  - First item. (\texttt{\textbackslash pause})
Uncovering Text
Subtitle: A Longer Example

You can create overlays...

- using the `\pause` command:
  - First item. (`\pause`)
  - Second item.
- using overlay specifications:

- using the general `\uncover` command:
  (`\uncover<5->{\item First item...}`)
You can create overlays...

- using the \texttt{\textbackslash pause} command:
  - First item. (\texttt{\textbackslash pause})
  - Second item.

- using overlay specifications:
  - First item. (\texttt{\item<3->})

- using the general \texttt{\textbackslash uncover} command:
  (\texttt{\textbackslash uncover<5->\{\item First item...\}})
You can create overlays . . .

- using the \pause command:
  - First item. (\pause)
  - Second item.

- using overlay specifications:
  - First item. (item<3->)
  - Second item.(item<4>)

- using the general \uncover command:
  (\uncover<5->{item First item...})
You can create overlays... 

- using the `\pause` command:
  - First item. (`\pause`)
  - Second item.

- using overlay specifications:
  - First item. (`\item<3->`)

- using the general `\uncover` command:
  (`\uncover<5->{\item First item...}`)
  - First item.
Uncovering Text
Subtitle: A Longer Example

You can create overlays…

- using the \texttt{\textbackslash pause} command:
  - First item. (\texttt{\textbackslash pause})
  - Second item.

- using overlay specifications:
  - First item. (\texttt{\item<3->})

- using the general \texttt{\uncover} command:
  \texttt{(\uncover<5->\{\item First item...\})}
  - First item.
  - Second item.
Uncover & alert

- **Apple**

\begin{itemize}
\item Apple
\item Peach
\item Plum
\item Orange
\end{itemize}
Uncover & alert

- Apple
- Peach

\begin{itemize}[<-+| alert@+>]
  \item Apple
  \item Peach
  \item Plum
  \item Orange
\end{itemize}
Uncover & alert

- Apple
- Peach
- Plum

\begin{itemize} [<+-| alert@+>]
  \item Apple
  \item Peach
  \item Plum
  \item Orange
\end{itemize}
Uncover & alert

- Apple
- Peach
- Plum
- Orange

\begin{itemize}[<+-| alert@+>]
  \item Apple
  \item Peach
  \item Plum
  \item Orange
\end{itemize}
Uncovering Equations

\[ A = \]
Uncovering Equations

\[ A = B \]
Uncovering Equations

\[ A = B \]
\[ = C \]
Uncovering Equations

\begin{align*}  
A &= B \\uncover<2->{B} \\
&= C \\uncover<2->{C} \\
&= D \\uncover<3->{D} 
\end{align*}
An example of replacement

This uses five overlays, each separate equations...

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} =
\]

Alignment not ideal.
An example of replacement

This uses five overlays, each separate equations...

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\texttt{\textbackslash alt} is used to replace the first line

Alignment not ideal.
An example of replacement

This uses five overlays, each separate equations...

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

and then visible, as opposed to uncover. Alignment not ideal.
An example of replacement

This uses five overlays, each separate equations...

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\[
= \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\[
= \frac{(x - 1)((x - 1) - 2(x + 3))}{(x - 1)^4}
\]

Alignment not ideal.
An example of replacement

This uses five overlays, each separate equations...

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\[
= \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\[
= \frac{(x - 1)((x - 1) - 2(x + 3))}{(x - 1)^4}
\]

\[
= \frac{((x - 1) - 2(x + 3))}{(x - 1)^3} = -\frac{x + 7}{(x - 1)^3}
\]

Alignment not ideal.
An example of replacement

This uses five overlays, each separate equations...

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
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\]

Alignment not ideal.
An example of \texttt{align} with replacement

Three overlays, ...

\begin{align*}
  \text{left} &= \text{rhs 1} \\
  \text{left} &= \text{rhs 1} \
  \text{visible} &= \text{rhs 3}
\end{align*}
An example of \texttt{align with replacement}

Three overlays, ...

\begin{align*}
\text{left} &= \text{alternate rhs} \\
\text{left} &= \alt<1>{\text{rhs1}}\{\text{alternate rhs}\} \\
\visible<3->\{&=\text{rhs3}\}
\end{align*}
An example of \texttt{align} with replacement

Three overlays, ...

\[ \begin{align*} 
\text{left} &= \text{alternate rhs} \\
&= \text{rhs 3} 
\end{align*} \]
An example of \texttt{align} with replacement

Three overlays, ... 

\begin{align*}
\text{left} &= \text{alternate rhs} \\
&= \text{rhs 3}
\end{align*}

Uses \texttt{alt} and \texttt{visible}, as opposed to \texttt{uncover}. 
An example of \texttt{align} with replacement

Three overlays, ...

\begin{align*}
\text{left} &= \text{alternate rhs} \\
&= \text{rhs 3}
\end{align*}

\begin{verbatim}
\begin{align*}
\text{left} &= \text{\texttt{alt}<1>{rhs1}{\text{alternate rhs}}} \\
&= \text{\texttt{visible}<3->{rhs3}}
\end{align*}
\end{verbatim}

Uses \texttt{alt} and \texttt{visible}, as opposed to \texttt{uncover}. Alignment spoiled because alternative is longer than original.
An example of $\texttt{align}$ with replacement

Use of $\backslash\texttt{phantom}$ to add invisible text to 3rd overlay to ensure correct alignment when $\backslash\texttt{alt}$ string is longest...

\[
\begin{align*}
\text{left} &= \text{rhs 1} \\
\text{rhs 1} \&= \text{alternate rhs 2} \\
\text{rhs 3} \&= \text{extra appended}
\end{align*}
\]
An example of \texttt{align} with replacement

Use of \texttt{\phantom} to add invisible text to 3rd overlay to ensure correct alignment when \texttt{\texttt{alt}} string is longest…

\begin{align*}
\text{left} &= \text{\texttt{alt}<1>:\texttt{rhs 1}}\texttt{\texttt{alternate rhs 2}} \\
\text{visible}<3-> &\texttt{=} \texttt{\texttt{rhs 3}} \texttt{\phantom{extra appended}}
\end{align*}
An example of \texttt{align} with replacement

Use of \texttt{\phantom} to add invisible text to 3rd overlay to ensure correct alignment when \texttt{\alt} string is longest…

\begin{align*}
\text{left} &= \text{alternate rhs 2} \\
&= \text{rhs 3}
\end{align*}

\begin{align*}
\text{\begin{align*}} \\
\text{left} &= \\
\text{\alt<1>{rhs 1}{alternate rhs 2}} \\
\text{\visible<3->} \text{\alt<1>{rhs 1}{alternate rhs 2}} \\
\text{\alt<3->} \text{\alt<1>{rhs 1}{alternate rhs 2}} \text{\phantom{extra appended}} \\
\end{align*}\end{align*}
The \texttt{align} environment with replacement

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} =
\]
The \texttt{align} environment with replacement

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\texttt{\textbackslash alt} replaces the first line.
The **align** environment with replacement

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4}
\]

\texttt{\textbackslash alt} replaces the first line and then \texttt{\textbackslash visible}, as opposed to \texttt{\textbackslash uncover}. 
The \texttt{align} environment with replacement

\[
\frac{d}{dx} \frac{x + 3}{(x - 1)^2} = \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4} \\
= \frac{(x - 1)^2 - 2(x + 3)(x - 1)}{(x - 1)^4} \\
= \frac{(x - 1)((x - 1) - 2(x + 3))}{(x - 1)^4}
\]

\texttt{\textbackslash alt} replaces the first line and then \texttt{\textbackslash visible}, as opposed to \texttt{\textbackslash uncover}. 
The \texttt{align} environment with replacement

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\]

\texttt{\textbackslash alt} replaces the first line and then \texttt{\textbackslash visible}, as opposed to \texttt{\textbackslash uncover}. Alignment is fixed.
# Uncovering Rows

<table>
<thead>
<tr>
<th>Class</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
# Uncovering Rows

<table>
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<tr>
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<tbody>
<tr>
<td>X</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Y</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
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<table>
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<td>6</td>
</tr>
<tr>
<td>Z</td>
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<td>6</td>
<td>7</td>
<td>8</td>
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</tr>
</tbody>
</table>

\usepackage{colortbl}

Uncovering Rows

<table>
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<tr>
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<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

\usepackage{colortbl}

\rowcolors[1]{blue!20}{red!10}
\begin{tabular}{l!{\vrule}cccc}
\hline
Class & A & B & C & D \\
\hline
X & 1 & 2 & 3 & 4 \\
Y & 3 & 4 & 5 & 6 \\
Z & 5 & 6 & 7 & 8 \\
\end{tabular}
<table>
<thead>
<tr>
<th>Structure</th>
<th>Lists</th>
<th>Fancy Bits</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Uncovering Columns**

<table>
<thead>
<tr>
<th>Class</th>
<th>A</th>
</tr>
</thead>
</table>
# Uncovering Columns

<table>
<thead>
<tr>
<th>Class</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
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</tbody>
</table>

\begin{tabular}{l!{\vrule}c<{{\onslide<2->}}\c<{{\onslide<3>}}\c<{{\onslide<4->}}\c}
....
\end{tabular}

\begin{tabular}{ }
....
\end{tabular}

\begin{tabular}{ }
\end{tabular}

\texttt{c<\{decl\}.} inserts \texttt{decl.} right after the entry for the column.
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   - Features
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3. Fancy Bits
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   - Movies
Theorem and Proof

**Theorem**

There is no largest prime number

**Proof.**

Suppose $p$ ... the largest prime
Theorem and Proof

**Theorem**

*There is no largest prime number*

**Proof.**

- Suppose $p$ ... the largest prime
- Let $q$ be the product of the first $p$ numbers
Theorem and Proof

**Theorem**

There is no largest prime number

**Proof.**

- Suppose $p$ ... the largest prime
- Let $q$ be the product of the first $p$ numbers
- Then $q + 1$ is not divisible by any of them
Theorem and Proof

Theorem

There is no largest prime number

Proof.

- Suppose $p$ ... the largest prime
- Let $q$ be the product of the first $p$ numbers
- Then $q + 1$ is not divisible by any of them
- Thus $q + 1$ is a prime number larger than $p$. 
Theorem and Proof

Theorem

There is no largest prime number

Proof.

- Suppose $p$ ... the largest prime
- Let $q$ be the product of the first $p$ numbers
- Then $q + 1$ is not divisible by any of them
- Thus $q + 1$ is a prime number larger than $p$. 
\begin{theorem}
There is no largest prime number
\end{theorem}

\begin{proof}
\begin{itemize}
\item Suppose $p$ were the largest prime
\item Let $q$ be the product of the first $p$ numbers
\item Then $q+1$ is not divisible by any of these numbers
\item Thus $q+1$ is a prime number greater than $p$.
\end{itemize}
\end{proof}
Cantor’s Theorem

Theorem

\[ \alpha < 2^{\alpha} \text{ for all ordinals } \alpha. \]
Outline

1 Structure
   - Features
   - Processing
   - Basics
   - Colour

2 Lists
   - Uncovering Text
   - Theorems/Proofs
   - Handouts

3 Fancy Bits
   - Columns
   - pstricks package
   - Movies
Printing slides for handouts

With the header
\documentclass[t,handout]{beamer}

(i) the $t$ option specifies vertically aligned top frames
Printing slides for handouts

With the header
\documentclass[t,handout]{beamer}

(i) the \texttt{t} option specifies vertically aligned top frames
(ii) all piecewise defined slides are aggregated into one.
Printing slides for handouts

With the header
\documentclass[t,handout]{beamer}

(i) the \texttt{t} option specifies vertically aligned top frames
(ii) all piecewise defined slides are aggregated into one.
(iii) \texttt{\usepackage{enumerate}}

\begin{enumerate}[(i)]
\item the \texttt{\blue{t}} option specifies ....
\item all piecewise defined ....
\end{enumerate}
Printing as article class

The header
\documentclass{article}
and package
\usepackage{beamerarticle}
cause the material to be typeset as a “normal” article—all frame references are ignored.
Sample page

### Contents

1. **Structure**
   1.1 Features ........................................... 1
   1.2 Basics .............................................. 1
   1.3 Colour ............................................... 1

2. **Lists**
   2.1 Uncovering Text ................................. 2
   2.2 Theorems/Proofs ................................. 5
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3. **Fancy Bits**
   3.1 Columns ............................................ 6
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1. **Structure**

1.1 **Features**

Beamer

Written by Till Tantau while completing his PhD.
Outline

1. Structure
   - Features
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2. Lists
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3. Fancy Bits
   - Columns
   - pstricks package
   - Movies
\begin{columns}[b]
\begin{column}{.25\textwidth}
\includegraphics[width=1.3in]{FILE.epsc}
\end{column}
\begin{column}{.75\textwidth}
text column
\end{column}
\end{columns}
Graphics & Text Side by Side

\begin{columns}[b]
\begin{column}{.25\textwidth}
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\end{column}
\begin{column}{.75\textwidth}
  text column
\end{column}
\end{columns}

[We actually use \texttt{semiverbatim} & incremental alerts.]
<table>
<thead>
<tr>
<th>Structure</th>
<th>Lists</th>
<th>Fancy Bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature</td>
<td>Processing</td>
<td>Basics</td>
</tr>
<tr>
<td>Uncovering Text</td>
<td>Theorems/Proofs</td>
<td>Handouts</td>
</tr>
<tr>
<td><strong>Fancy Bits</strong></td>
<td></td>
<td>Columns</td>
</tr>
</tbody>
</table>
A small diagram with a few lines of \LaTeX.

\[ (X - A, N - A) \xrightarrow{a} (\tilde{X}, a) \]

\[ (X, N) \xrightarrow{r} (X, N) \]

\[ (\tilde{X}, N) \xrightarrow{s} (\tilde{X}, N) \]

\[ (X - A, N - A) \xrightarrow{b} (\tilde{X}, N) \]

\[ \text{\texttt{\textcolor{blue}{\textsc{PSTricks}}}} \]

...\[
\text{\texttt{\visible<2>{\textcolor{blue}{\textsc{PSTricks}}}} [\texttt{linecolor=red,angleA=270,angleB=300}] \texttt{\textsc{PSTricks}}} \]
Diagrams

A small diagram with a few lines of \LaTeX. At the 2nd overlay we can add a link from one to another using \texttt{PSTricks}

\[
\begin{align*}
(X - A, N - A) & \quad \overset{a}{\longrightarrow} \quad (\bar{X}, a) \\
(X, N) & \quad \overset{r}{\longleftarrow} \quad (\bar{X}, N) \\
\end{align*}
\]

\[
\{
\textcolor{blue}{\textsc{PSTricks}}
\}
\]

\[
\ldots
\]

\[
\texttt{visible<2>}{\texttt{nccurve}}%
\[
[\texttt{linecolor=red,angleA=270,angleB=300}]{\texttt{START}}{\texttt{c}}
\]
The Householder formula below lets one compute $f(x_*) = 0$ for an arbitrary $f$.

$$x_{k+1} \mapsto \Phi_n(x_k) = x_k + (n - 1)\left(\frac{1}{f(x_k)}\right)^{n-2} + f(x_k)^n + 1$$ (1)
The Householder formula below lets one compute $f(x_*) = 0$ for an arbitrary $f$.

$$x_{k+1} \mapsto \Phi_n(x_k) = x_k + (n - 1) \left( \frac{1}{f(x_k)} \right)^{n-2} + f(x_k)^{n+1} \psi$$

where $n \geq 2$ and $\psi$ is an arbitrary function.
The Householder formula below lets one compute $f(x_*) = 0$ for an arbitrary $f$.

$$x_{k+1} \mapsto \Phi_n(x_k) = x_k + (n - 1) \frac{1}{f(x_k)}^{n-2} + f(x_k)^{n+1} \psi$$

where $n \geq 2$ and $\psi$ is an arbitrary function. Formula (1) gives an iteration of order $n$ converging towards $x_*$ such that: $f(x_*) = 0$. 
Some PSTricks

Any practical use for this?
Some more PSTricks

or this ...

\pstextpath{\psccurve[linestyle=none]\% (.5,0)(3.5,1)(3.5,0)(.5,1)\% \{\textcolor{blue}{ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--ICM}}
Outline

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Including Movies

\movie[width=3in, height=2in, showcontrols, poster]{thank.avi}

Even though the movie is “embedded” in the .tex file, the .avi file must still reside in the same folder as the pdf file.
The first main message of your talk in one or two lines.
Summary

- The **first main message** of your talk in one or two lines.
- The **second main message** of your talk in one or two lines.
Summary

- The **first main message** of your talk in one or two lines.
- The **second main message** of your talk in one or two lines.
- Perhaps a **third message**, but not more than that.
Summary

- The **first main message** of your talk in one or two lines.
- The **second main message** of your talk in one or two lines.
- Perhaps a **third message**, but not more than that.

**Outlook**
- Something you haven’t solved.
- Something else you haven’t solved.
Cantor’s Theorem

Theorem
\[ \alpha < 2^\alpha \text{ for all ordinals } \alpha. \]

Proof.
As shown by Cantor...
A. Author.
Handbook of Everything.

S. Someone.
On this and that.

D.F. Griffiths
Beamer By Example
http://www.maths.dundee.ac.uk/~dfg/talks.shtml