How to Make Presentation by Beamer

- An Introduction

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July 26, 2017

Why Beamer

Pros:

- Both dvips/ps2pdf and pdflatex supports
- Rich overlay and transition effects
- Navigational bars and symbols
- Outputs: screen, transparency, handouts, and notes
- Emulation of other PDF presetation tools such as Prosper
- Easy to type math
- WYSIWYM (What You See Is What You Mean)

Cons:

- Not WYSIWYG (What You See Is What You Get)
- Steep learning curve
- Difficult to design a template

My First Slide

```
\documentclass{beamer}
\begin{document}
  \begin{frame}
    Hello World!
  \end{frame}
\end{document}
```

Frame Titles

...and Subtitles

Two ways to create titles and subtitles for a frame:

- \begin{frame}{*Frame Title*}{*Frame Subtitle*}
- \frametitle{*Frame Title*}\framesubtitle{*Frame Subtitle*}

Sectioning

Notice the sections and subsections at the top of each slide.

- **\section**[*Short Section Name*]{*Long Section Name*}
- **\subsection**[*Short Subsection Name*]{*Long Subsection Name*}

Sectioning

Notice the sections and subsections at the top of each slide.

- \section[*Short Section Name*]{*Long Section Name*}
- \subsection[*Short Subsection Name*]{*Long Subsection Name*}

"Short names" go into slide headers;
"Long names" go into outlines.

Sectioning

Notice the sections and subsections at the top of each slide.

- \section[*Short Section Name*]{*Long Section Name*}
- \subsection[*Short Subsection Name*]{*Long Subsection Name*}

"Short names" go into slide headers;
"Long names" go into outlines.

All sections and subsections automatically added to slideshow outline!

Looooooong Slides

Beamer does not automatically put what doesn't fit from one slide onto another slide.

- You must keep track of slide lengths yourself; or
- you can use the frame option `\begin{frame}[allowframebreaks]`

This automatically breaks up the long slide and puts the extra content onto new slides.

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+ You don't have to worry about the length of your slides.
+ Slide title is continued on each subsequent slide.
- Most overlay options are not usable.

Verbatim

```
int main (void) {
std::vector<bool> is_prime (100, true);
 for (int i = 2; i < 100; i++)




   return 0;
}
```

Verbatim

```
int main (void) {
std::vector<bool> is_prime (100, true);
 for (int i = 2; i < 100; i++)
 if (is_prime[i])
{


 }  return 0;
}
```

Verbatim

```
int main (void) {
std::vector<bool> is_prime (100, true);
 for (int i = 2; i < 100; i++)
 if (is_prime[i])
{  std::cout « i « ” ”;
 for (int j = i; j < 100;
 is_prime [j] = false, j+=i);
 }  return 0;
}
```

Verbatim

```
int main (void) {
std::vector<bool> is_prime (100, true);
 for (int i = 2; i < 100; i++)
 if (is_prime[i])
{  std::cout « i « ” ”;
 for (int j = i; j < 100;
 is_prime [j] = false, j+=i);
 }  return 0;
}
```

Using Verbatim

To use any sort of verbatim text, you must declare the frame as *fragile*:

\begin{frame}[fragile]

Use \path{content}, \verb|content| or verbatim environment.

Enumerate

A This is the first item.

B This is the second item.

C Yes, this is the third one!

```
\begin{enumerate}[minitemplate]
  \item ...
\end{enumerate}
```

where minitemplate can be empty or 'A','a', 'i', 'I', '(A)', ...

Framed Text

Theorem

You can read this.

Warning

You are warned!

Beamer supports predefined framed texts:

theorem, corollary, definition in structure color frame
examples in green color frame
block in structure color frame with your own title
alertblock in alert color frame with your own title

User-defined Framed Text

Theorem

$A = B$.

Source code:

```
{
\setbeamercolor{uppercol}{fg=white,bg=green!80}%
\setbeamercolor{lowercol}{fg=black,bg=green!10}%
\begin{beamerboxesrounded}%
[upper=uppercol,lower=lowercol,shadow=true]{Theorem}
  $A = B$.
\end{beamerboxesrounded}
}
```

\includegraphics{}

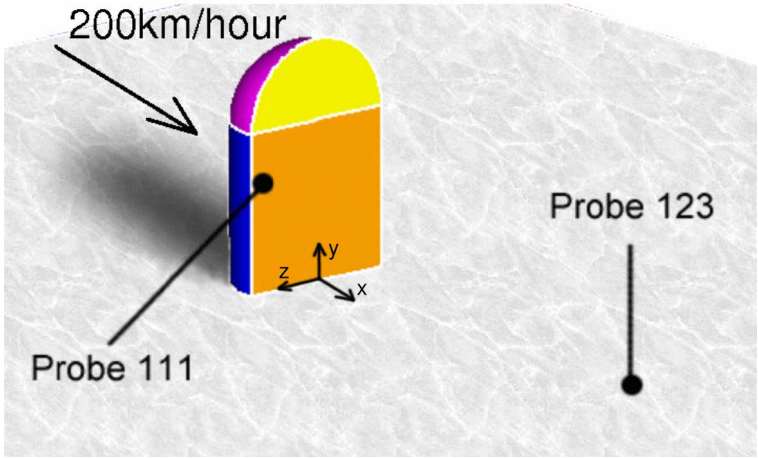
```
\begin{columns}
\begin{column}{.5\textwidth}
  \centering
  \includegraphics[width=\textwidth]{Zooey1}
\end{column}
\begin{column}{.5\textwidth}
  \centering
  \includegraphics[width=\textwidth]{Zooey2}
\end{column}
\end{columns}
```

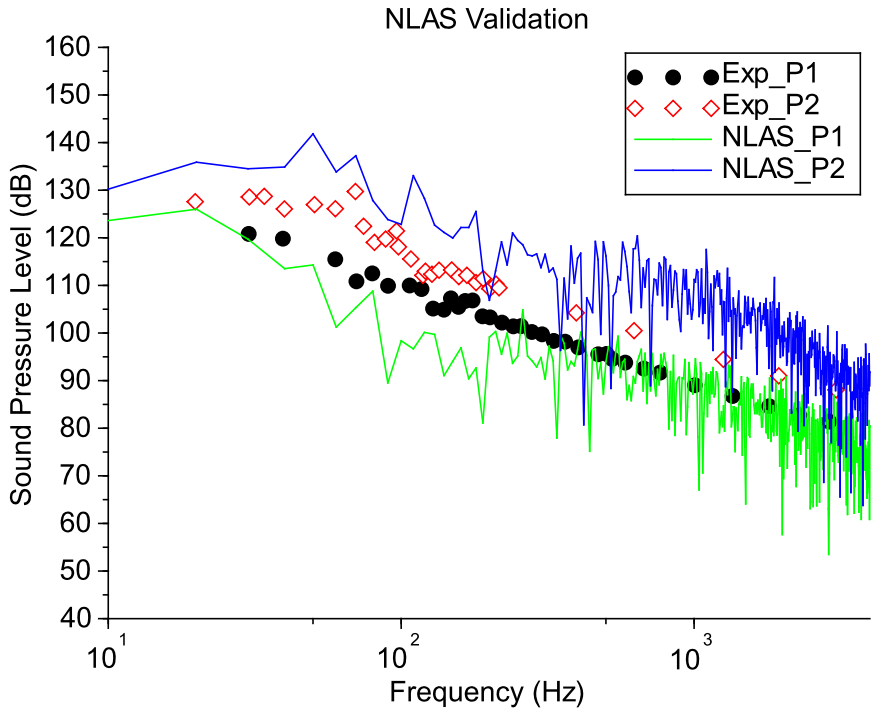
Zooming Figure

Grammar:

- Figures can be zoomed using
- **\framezoom<buttonoverlay><zoomedoverlay>[options](x,y)(w,h)**
- options: border.
- (x,y): Upper left coordinate point.
  They are measures relative to the place where the first normal text of a frame would go. Thus, the location $(0pt, 0pt)$ is at the beginning of the normal text (which excludes the headline and also the frame title).
- (w,h): Width and height for zooming.

Zooming Figure





Comments:

* Agreement is favorable across the spectrum
* overestimate the sound pressure at probe 2

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.

More More More Columns

Left column
blah blah blah blah

Middle column
blah blah blah blah

Right column
blah blah blah blah

Bottom Left column
blah blah blah blah

Bottom Right column
blah blah blah blah

Columns with Graphics I

Two
lines.

```
\begin{columns}[T]
\column{5cm}
  Two\\lines.
\column[c]{5cm}
  \includegraphics[width=4cm]{Zooey}
\end{columns}
```

Columns with Graphics II

Two
lines.

```
\begin{columns}[c]
\column{5cm}
  Two\\lines.
\column[c]{5cm}
  \includegraphics[width=4cm]{Zooey}
\end{columns}
```

Columns with Graphics III

Columns with Graphics IV

- *Important text*

Columns with Graphics IV

- *Important text*
- Very important process

Columns with Graphics IV

- *Important text*
- Very important process
  - Steps one and two

Columns with Graphics IV

- *Important text*
- Very important process
  - Steps one and two

Columns with Graphics IV

- *Important text*
- Very important process
  - Steps one and two
  - Step with no image

Test Minipage I

- Item 1
- Item 2

Test Minipage II

- Another item I

Test Minipage II

- Another item 1
- Another item 2

Test Minipage II

- Another item 1
- Another item 2
- This list is longer

Test Minipage II

- Another item 1
- Another item 2
- This list is longer
- Than the previous one.

A Simple One

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  1 & 2 & 3 \\
  \hline
  4 & 5 & 6 \\
  7 & 8 & 9 \\
  \hline
 \end{tabular}
\end{center}
```

1	2	3
4	5	6
7	8	9

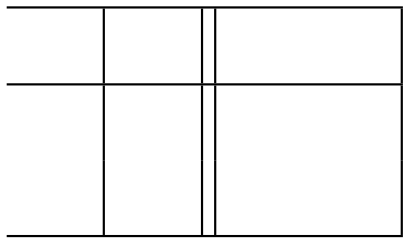
More Complicated

```
\begin{center}
 \begin{tabular}{|r|l|}
  \hline
  7C0 & hexadecimal \\
  3700 & octal \\ \cline{2-2}
  11111000000 & binary \\
  \hline \hline
  1984 & decimal \\
  \hline
 \end{tabular}
\end{center}
```

7C0	hexadecimal
3700	octal
11111000000	binary
1984	decimal

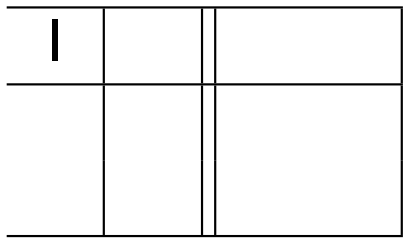
Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```



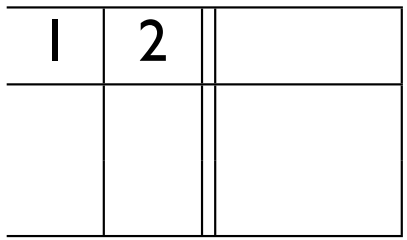
Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```



Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```



Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```

1	2	hello

Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```

1	2	hello
4	5	6

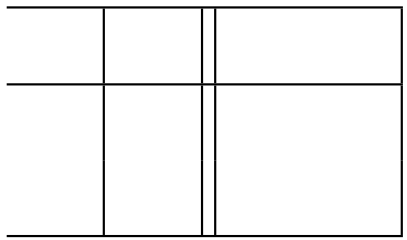
Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```

1	2	hello
4	5	6
7	8	9

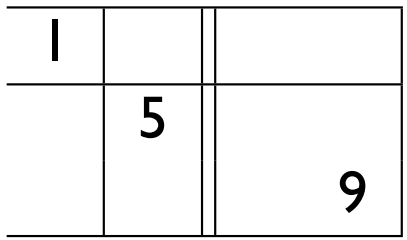
Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```



Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```



Even More Complicated

```
\begin{center}
 \begin{tabular}{ l | c || r | }
  \hline
  \onslide<2-6,8>{1} & \onslide<3-6>{2} & \onslide<4-6,9>{hello} \\
  \hline
  \onslide<5-6>{4} & \onslide<5-6,8,9>{5} & \onslide<5-6>{6} \\
  \onslide<6,9>{7} & \onslide<6>{8} & \onslide<6,8>{9} \\
  \hline
 \end{tabular}
\end{center}
```

		hello
7	5	

Pause for Stepwise Viewing

```
\begin{itemize}
\item
 Shown from first slide on.
\pause
\item
 Shown from second slide on.
 \begin{itemize}
 \item
  Shown from second slide on.
 \pause
 \item
  Shown from third slide on.
 \end{itemize}
\item
 Shown from third slide on.
\pause
\item
 Shown from fourth slide on.
\end{itemize}
Shown from fourth slide on.
\begin{itemize}
\onslide
\item
 Shown from first slide on.
\pause
\item
 Shown from fifth slide on.
\end{itemize}
```

- Shown from first slide on.

- Shown from first slide on.

Pause for Stepwise Viewing

```
\begin{itemize}
\item
 Shown from first slide on.
\pause
\item
 Shown from second slide on.
 \begin{itemize}
 \item
  Shown from second slide on.
 \pause
 \item
  Shown from third slide on.
 \end{itemize}
\item
 Shown from third slide on.
\pause
\item
 Shown from fourth slide on.
\end{itemize}
Shown from fourth slide on.
\begin{itemize}
\onslide
\item
 Shown from first slide on.
\pause
\item
 Shown from fifth slide on.
\end{itemize}
```

- Shown from first slide on.
- Shown from second slide on.
  - Shown from second slide on.

- Shown from first slide on.

Pause for Stepwise Viewing

```
\begin{itemize}
\item
 Shown from first slide on.
\pause
\item
 Shown from second slide on.
 \begin{itemize}
 \item
  Shown from second slide on.
 \pause
 \item
  Shown from third slide on.
 \end{itemize}
\item
 Shown from third slide on.
\pause
\item
 Shown from fourth slide on.
\end{itemize}
Shown from fourth slide on.
\begin{itemize}
\onslide
\item
 Shown from first slide on.
\pause
\item
 Shown from fifth slide on.
\end{itemize}
```

- Shown from first slide on.
- Shown from second slide on.
  - Shown from second slide on.
  - Shown from third slide on.
- Shown from third slide on.

- Shown from first slide on.

Pause for Stepwise Viewing

```
\begin{itemize}
\item
 Shown from first slide on.
\pause
\item
 Shown from second slide on.
 \begin{itemize}
 \item
  Shown from second slide on.
 \pause
 \item
  Shown from third slide on.
 \end{itemize}
\item
 Shown from third slide on.
\pause
\item
 Shown from fourth slide on.
\end{itemize}
Shown from fourth slide on.
\begin{itemize}
\onslide
\item
 Shown from first slide on.
\pause
\item
 Shown from fifth slide on.
\end{itemize}
```

- Shown from first slide on.
- Shown from second slide on.
  - Shown from second slide on.
  - Shown from third slide on.
- Shown from third slide on.
- Shown from fourth slide on.

Shown from fourth slide on.

- Shown from first slide on.

Pause for Stepwise Viewing

```
\begin{itemize}
\item
 Shown from first slide on.
\pause
\item
 Shown from second slide on.
 \begin{itemize}
 \item
  Shown from second slide on.
 \pause
 \item
  Shown from third slide on.
 \end{itemize}
\item
 Shown from third slide on.
\pause
\item
 Shown from fourth slide on.
\end{itemize}
Shown from fourth slide on.
\begin{itemize}
\onslide
\item
 Shown from first slide on.
\pause
\item
 Shown from fifth slide on.
\end{itemize}
```

- Shown from first slide on.
- Shown from second slide on.
  - Shown from second slide on.
  - Shown from third slide on.
- Shown from third slide on.
- Shown from fourth slide on.

Shown from fourth slide on.

- Shown from first slide on.
- Shown from fifth slide on.

Pause for Stepwise Viewing

```
\begin{itemize}
\item
 Shown from first slide on.
\pause
\item
 Shown from second slide on.
 \begin{itemize}
 \item
  Shown from second slide on.
 \pause
 \item
  Shown from third slide on.
 \end{itemize}
\item
 Shown from third slide on.
\pause
\item
 Shown from fourth slide on.
\end{itemize}
Shown from fourth slide on.
\begin{itemize}
\onslide
\item
 Shown from first slide on.
\pause
\item
 Shown from fifth slide on.
\end{itemize}
```

- Shown from first slide on.
- Shown from second slide on.
  - Shown from second slide on.
  - Shown from third slide on.
- Shown from third slide on.
- Shown from fourth slide on.

Shown from fourth slide on.

- Shown from first slide on.
- Shown from fifth slide on.

Note that pause does not know overlay counters.

Pause: Table Example

- Row increment in a table:

Pause: Table Example

- Row increment in a table:

Class	A	B	C	D
X	1	2	3	4

Pause: Table Example

- Row increment in a table:

Class	A	B	C	D
X	1	2	3	4
Y	3	4	5	6

Pause: Table Example

- Row increment in a table:

Class	A	B	C	D
X	1	2	3	4
Y	3	4	5	6
Z	5	6	7	8

- Source code:

```
\rowcolors[]{1}{blue!20}{blue!10}
\begin{tabular}{l!{\vrule}cccc}
  Class & A & B & C & D \\\hline
  X & 1 & 2 & 3 & 4 \pause \\
  Y & 3 & 4 & 5 & 6 \pause \\
  Z & 5 & 6 & 7 & 8
\end{tabular}
```

Onslide for Stepwise Viewing

- \onslide<n->stuff shows stuff on the given slides.
- Example: Column increment in a table:

Class	A
X	1
Y	3
Z	5

- Source code:

```
\rowcolors[]{1}{blue!20}{blue!10}
\begin{tabular}{l!{\vrule}c<{\onslide<2->}c<{\onslide<3->}%
   c<{\onslide<4->}c<{\onslide}c}
   Class & A & B & C & D \\
   X & 1 & 2 & 3 & 4 \\
   Y & 3 & 4 & 5 & 6 \\
   Z & 5 & 6 & 7 & 8
\end{tabular}
```

Onslide for Stepwise Viewing

- \onslide<n->stuff shows stuff on the given slides.
- Example: Column increment in a table:

Class	A	B
X	1	2
Y	3	4
Z	5	6

- Source code:

```
\rowcolors[]{1}{blue!20}{blue!10}
\begin{tabular}{l!{\vrule}c<{\onslide<2->}c<{\onslide<3->}%
   c<{\onslide<4->}c<{\onslide}c}
   Class & A & B & C & D \\
   X & 1 & 2 & 3 & 4 \\
   Y & 3 & 4 & 5 & 6 \\
   Z & 5 & 6 & 7 & 8
\end{tabular}
```

Onslide for Stepwise Viewing

- \onslide<n->stuff shows stuff on the given slides.
- Example: Column increment in a table:

Class	A	B	C
X	1	2	3
Y	3	4	5
Z	5	6	7

- Source code:

```
\rowcolors[]{1}{blue!20}{blue!10}
\begin{tabular}{l!{\vrule}c<{\onslide<2->}c<{\onslide<3->}%
   c<{\onslide<4->}c<{\onslide}c}
   Class & A & B & C & D \\
   X & 1 & 2 & 3 & 4 \\
   Y & 3 & 4 & 5 & 6 \\
   Z & 5 & 6 & 7 & 8
\end{tabular}
```

Onslide for Stepwise Viewing

- \onslide<n->stuff shows stuff on the given slides.
- Example: Column increment in a table:

Class	A	B	C	D
X	1	2	3	4
Y	3	4	5	6
Z	5	6	7	8

- Source code:

```
\rowcolors[]{1}{blue!20}{blue!10}
\begin{tabular}{l!{\vrule}c<{\onslide<2->}c<{\onslide<3->}%
   c<{\onslide<4->}c<{\onslide}c}
   Class & A & B & C & D \\
   X & 1 & 2 & 3 & 4 \\
   Y & 3 & 4 & 5 & 6 \\
   Z & 5 & 6 & 7 & 8
\end{tabular}
```

Item for Step Viewing I

item<n-> for incremental overlays with overlay counters.

```
\begin{itemize}
  \item<2-> Every thing
  \item<3-> that has
  \item<4-> beginning
  \item<5-> and end.
\end{itemize}
```

Item for Step Viewing I

item<n-> for incremental overlays with overlay counters.

```
\begin{itemize}
  \item<2-> Every thing
  \item<3-> that has
  \item<4-> beginning
  \item<5-> and end.
\end{itemize}
```

- Every thing

Item for Step Viewing I

item<n-> for incremental overlays with overlay counters.

```
\begin{itemize}
  \item<2-> Every thing
  \item<3-> that has
  \item<4-> beginning
  \item<5-> and end.
\end{itemize}
```

- Every thing
- that has

Item for Step Viewing I

item<n-> for incremental overlays with overlay counters.

```
\begin{itemize}
  \item<2-> Every thing
  \item<3-> that has
  \item<4-> beginning
  \item<5-> and end.
\end{itemize}
```

- Every thing
- that has
- beginning

Item for Step Viewing I

item<n-> for incremental overlays with overlay counters.

```
\begin{itemize}
  \item<2-> Every thing
  \item<3-> that has
  \item<4-> beginning
  \item<5-> and end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Item for Step Viewing I

item<n-> for incremental overlays with overlay counters.

```
\begin{itemize}
  \item<2-> Every thing
  \item<3-> that has
  \item<4-> beginning
  \item<5-> and end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

\item<n1-n2> for fine control of overlays.

Item for Step Viewing II

<+-> for incremental overlays automaticlly.

```
\begin{itemize}[<+->]
  \item Every thing
  \item that has
  \item beginning
  \item and end.
\end{itemize}
```

- Every thing

Item for Step Viewing II

<+-> for incremental overlays automaticlly.

```
\begin{itemize}[<+->]
  \item Every thing
  \item that has
  \item beginning
  \item and end.
\end{itemize}
```

- Every thing
- that has

Item for Step Viewing II

<+-> for incremental overlays automaticlly.

```
\begin{itemize}[<+->]
  \item Every thing
  \item that has
  \item beginning
  \item and end.
\end{itemize}
```

- Every thing
- that has
- beginning

Item for Step Viewing II

<+-> for incremental overlays automaticlly.

```
\begin{itemize}[<+->]
  \item Every thing
  \item that has
  \item beginning
  \item and end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒ Only1

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide1

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒ Only2

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide2

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒ Only3

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide3

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide4

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒ I am 5

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide5

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide6

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide7

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide8

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide9

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide10

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide11

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide12

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 13

Slide13

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 14

Slide14

Replace

- Successive **\only<n>{...}**.

  (Ex)\only<1>{Only1}\only<2>{Only2}\only<3>{Only3} ⇒

- **\uncover<n>{...}** shows at given n.

  (Ex)\uncover<5>{Iam5} ⇒

- **\invisible<n>{...}** hides at given n.

  (Ex)\invisible<8>{Invisibleat8} ⇒ Invisible at 8

- **\alt<n>{atn}{notatn}** for two alternatives.

  (Ex)\alt<11>{Iam11}{Iamnot11} ⇒ I am not 11

- **\temporal<n>{before}{atn}{after}** for three alternatives.

  (Ex)\temporal<14>{Iam13}{Iam14}{Iam15} ⇒ I am 15

Slide15

More Replaces

In case if subtle differences in the heights of replacements, it may lead to slight, but annoying differences in the heights of the lines, which may cause the whole frame to ”wobble” from slide to slide. To solve this problem, overlayarea and overprint environment can be used.

Example:

Some text for the first slide.
Possibly several lines long.

```
\begin{overlayarea}{\textwidth}{3cm}
 \only<1>{Some text for the first slide.\\
       Possibly several lines long.}
 \only<2>{Replacement on the second slide.}
\end{overlayarea}
```

More Replaces

In case if subtle differences in the heights of replacements, it may lead to slight, but annoying differences in the heights of the lines, which may cause the whole frame to ”wobble” from slide to slide. To solve this problem, overlayarea and overprint environment can be used.

Example:

Replacement on the second slide.

```
\begin{overlayarea}{\textwidth}{3cm}
  \only<1>{Some text for the first slide.\\
        Possibly several lines long.}
  \only<2>{Replacement on the second slide.}
\end{overlayarea}
```

Environments with Overlay Specifications

Theorem

Exists infinite set.

```
\begin{theorem}<1->
  Exists infinite set.
\end{theorem}
\begin{proof}<3->
  Axiom of infinity.
\end{proof}
\begin{example}<2->
  Natural numbers.
\end{example}
```

Environments with Overlay Specifications

Theorem

Exists infinite set.

```
\begin{theorem}<1->
  Exists infinite set.
\end{theorem}
\begin{proof}<3->
  Axiom of infinity.
\end{proof}
\begin{example}<2->
  Natural numbers.
\end{example}
```

Example

Natural numbers.

Environments with Overlay Specifications

Theorem

Exists infinite set.

Proof.

Axiom of infinity. □

Example

Natural numbers.

```
\begin{theorem}<1->
  Exists infinite set.
\end{theorem}
\begin{proof}<3->
  Axiom of infinity.
\end{proof}
\begin{example}<2->
  Natural numbers.
\end{example}
```

Environments with Overlay Specifications

Theorem

Exists infinite set.

Proof.

Axiom of infinity. □

Example

Natural numbers.

```
\begin{theorem}<1->
  Exists infinite set.
\end{theorem}
\begin{proof}<3->
  Axiom of infinity.
\end{proof}
\begin{example}<2->
  Natural numbers.
\end{example}
```

Note

Various overlay counters: 'n', 'n-', '-n', 'n1-n2', '+-'.

\textbf, \textit, \textsl,
\textrm, \textsf, and
\color also understand overlays.

Simple Highlighting

\item<+-|alert@+> for automatic highlighting.

```
\begin{itemize}
 \item <+-| alert@+> Every thing
 \item <+-| alert@+> that has
 \item <+-| alert@+> beginning
 \item <+-| alert@+> has end.
\end{itemize}
```

- **Every thing**

- You can also use \begin{itemize}[<+-|alert@+>] instead of individual '\item<+-|alert@+>'.
- You can use structure instead of alert.

Simple Highlighting

\item<+-|alert@+> for automatic highlighting.

```
\begin{itemize}
 \item <+-| alert@+> Every thing
 \item <+-| alert@+> that has
 \item <+-| alert@+> beginning
 \item <+-| alert@+> has end.
\end{itemize}
```

- Every thing
- **that has**

- You can also use \begin{itemize}[<+-|alert@+>] instead of individual '\item<+-|alert@+>'.
- You can use structure instead of alert.

Simple Highlighting

\item<+-|alert@+> for automatic highlighting.

```
\begin{itemize}
 \item <+-| alert@+> Every thing
 \item <+-| alert@+> that has
 \item <+-| alert@+> beginning
 \item <+-| alert@+> has end.
\end{itemize}
```

- Every thing
- that has
- **beginning**

- You can also use \begin{itemize}[<+-|alert@+>] instead of individual '\item<+-|alert@+>'.
- You can use structure instead of alert.

Simple Highlighting

\item<+-|alert@+> for automatic highlighting.

```
\begin{itemize}
 \item <+-| alert@+> Every thing
 \item <+-| alert@+> that has
 \item <+-| alert@+> beginning
 \item <+-| alert@+> has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- **has end.**

- You can also use \begin{itemize}[<+-|alert@+>] instead of individual '\item<+-|alert@+>'.
- You can use structure instead of alert.

Alert for Highlighting

\item<n->\alert<m>{stuff} is better than the previous automatic one.

```
\begin{itemize}
  \item<1->\alert<2> {Every thing}
  \item<1->\alert<3> {that has}
  \item<1->\alert<4> {beginning}
  \item<1->\alert<5> {has end.}
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Note that \item<1->\alert<2> is same to \item<1-|alert@2>.

Alert for Highlighting

\item<n->\alert<m>{stuff} is better than the previous automatic one.

```
\begin{itemize}
  \item<1->\alert<2> {Every thing}
  \item<1->\alert<3> {that has}
  \item<1->\alert<4> {beginning}
  \item<1->\alert<5> {has end.}
\end{itemize}
```

- **Every thing**
- that has
- beginning
- has end.

Note that \item<1->\alert<2> is same to \item<1-|alert@2>.

Alert for Highlighting

\item<n->\alert<m>{stuff} is better than the previous automatic one.

```
\begin{itemize}
  \item<1->\alert<2> {Every thing}
  \item<1->\alert<3> {that has}
  \item<1->\alert<4> {beginning}
  \item<1->\alert<5> {has end.}
\end{itemize}
```

- Every thing
- **that has**
- beginning
- has end.

Note that \item<1->\alert<2> is same to \item<1-|alert@2>.

Alert for Highlighting

\item<n->\alert<m>{stuff} is better than the previous automatic one.

```
\begin{itemize}
  \item<1->\alert<2> {Every thing}
  \item<1->\alert<3> {that has}
  \item<1->\alert<4> {beginning}
  \item<1->\alert<5> {has end.}
\end{itemize}
```

- Every thing
- that has
- **beginning**
- has end.

Note that \item<1->\alert<2> is same to \item<1-|alert@2>.

Alert for Highlighting

\item<n->\alert<m>{stuff} is better than the previous automatic one.

```
\begin{itemize}
  \item<1->\alert<2> {Every thing}
  \item<1->\alert<3> {that has}
  \item<1->\alert<4> {beginning}
  \item<1->\alert<5> {has end.}
\end{itemize}
```

- Every thing
- that has
- beginning
- **has end.**

Note that \item<1->\alert<2> is same to \item<1-|alert@2>.

Temporal for Highlighting

- \temporal<n>{before}{on}{after} for highlighting
- Ready?
  - Everything
  - that has
  - beginning
  - has end.
- Source code:

```
\def\hilite<#1>{%
\temporal<#1>{\color{gray}}{\color{blue}}%
{\color{blue!25}}}
...
\begin{itemize}
  \hilite<3> \item Everything
  \hilite<4> \item that has
  \hilite<5> \item beginning
  \hilite<6> \item has end.
\end{itemize}
```

Temporal for Highlighting

- \temporal<n>{before}{on}{after} for highlighting
- Ready?
  - Everything
  - that has
  - beginning
  - has end.
- Source code:

```
\def\hilite<#1>{%
\temporal<#1>{\color{gray}}{\color{blue}}%
{\color{blue!25}}}
...
\begin{itemize}
  \hilite<3> \item Everything
  \hilite<4> \item that has
  \hilite<5> \item beginning
  \hilite<6> \item has end.
\end{itemize}
```

Temporal for Highlighting

- \temporal<n>{before}{on}{after} for highlighting
- Ready?
  - Everything
  - that has
  - beginning
  - has end.
- Source code:

```
\def\hilite<#1>{%
\temporal<#1>{\color{gray}}{\color{blue}}%
{\color{blue!25}}}
...
\begin{itemize}
  \hilite<3> \item Everything
  \hilite<4> \item that has
  \hilite<5> \item beginning
  \hilite<6> \item has end.
\end{itemize}
```

Temporal for Highlighting

- \temporal<n>{before}{on}{after} for highlighting
- Ready?
  - Everything
  - that has
  - beginning
  - has end.
- Source code:

```
\def\hilite<#1>{%
\temporal<#1>{\color{gray}}{\color{blue}}%
{\color{blue!25}}}
...
\begin{itemize}
  \hilite<3> \item Everything
  \hilite<4> \item that has
  \hilite<5> \item beginning
  \hilite<6> \item has end.
\end{itemize}
```

Temporal for Highlighting

- \temporal<n>{before}{on}{after} for highlighting
- Ready?
  - Everything
  - that has
  - beginning
  - has end.
- Source code:

```
\def\hilite<#1>{%
\temporal<#1>{\color{gray}}{\color{blue}}%
{\color{blue!25}}}
...
\begin{itemize}
  \hilite<3> \item Everything
  \hilite<4> \item that has
  \hilite<5> \item beginning
  \hilite<6> \item has end.
\end{itemize}
```

Hyperlinks and Buttons

- Beamer provides additional options for hyperlinks and buttons.
- \hyperlink{targetname}{\beamergotobutton{text}} to create link.
- \hypertarget{targetname}{text} to create target.
- To make a button "clickable" you must place it in a command like \hyperlink.
- Some useful buttons are \beamerbutton, \beamergotobutton, \beamerreturnbutton and \beamerskipbutton.
- To go to the title page, click Title Page
- To go to the end of presentation, click End Page
- To go to the appendix, click Appendix

Beamer Skip Button

The symbol drawn for this button is usually a double right arrow. Use this button if pressing it will skip over a well-defined part of your talk.

Theorem

I got a theorem.

⏩ Skip proof

Beamer Skip Button

The symbol drawn for this button is usually a double right arrow. Use this button if pressing it will skip over a well-defined part of your talk.

Theorem

I got a theorem.

Proof.

I am trying... □

Beamer Goto and Return Button

Theorem

I got a theorem...

▸ Go to proof details

Animations Created by Showing Slides in Rapid Succession

- To facilitate the creation of animations using this feature, the following commands can be used: \animate and \animatevalue.
- \animate<overlayspecification>
  The slides specified by *overlay specification* will be shown as quickly as possible.
- \animatevalue<startslide-endslide>{name}{startvalue}{endvalue}
  The *name* must be the name of a *counter* or a *dimension*. It will be varied between two values. For the slides in the specified range, the counter or dimension is set to an interpolated value that depends on the current slide number. On slides before the *start slide* the counter or dimension is set to *start value*, on the slides after the *end slide* it is set to *end value*.
- Use with caution as animation needs lots of slides.
- For Acrobat Adobe Reader, this works only in full-screen mode.

A Five Slide Animation with \animate<n1-n2>

The first slide is shown normally. When the second slide is shown (presumably after pressing a forward key), the second, third, and fourth slides ”flash by” At the end, the content of the fifth slide is shown.

- Everything

A Five Slide Animation with \animate<n1-n2>

The first slide is shown normally. When the second slide is shown (presumably after pressing a forward key), the second, third, and fourth slides ”flash by” At the end, the content of the fifth slide is shown.

- Everything
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- that has
- beginning

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- Everything
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- Everything
- that has
- beginning
- has end.
- That's right!

Thanks for your attention!

9 Appendix

Additional Material

Further Reading

- The Wikibooks
- Beamer's User Guide

Beamer Goto and Return Button

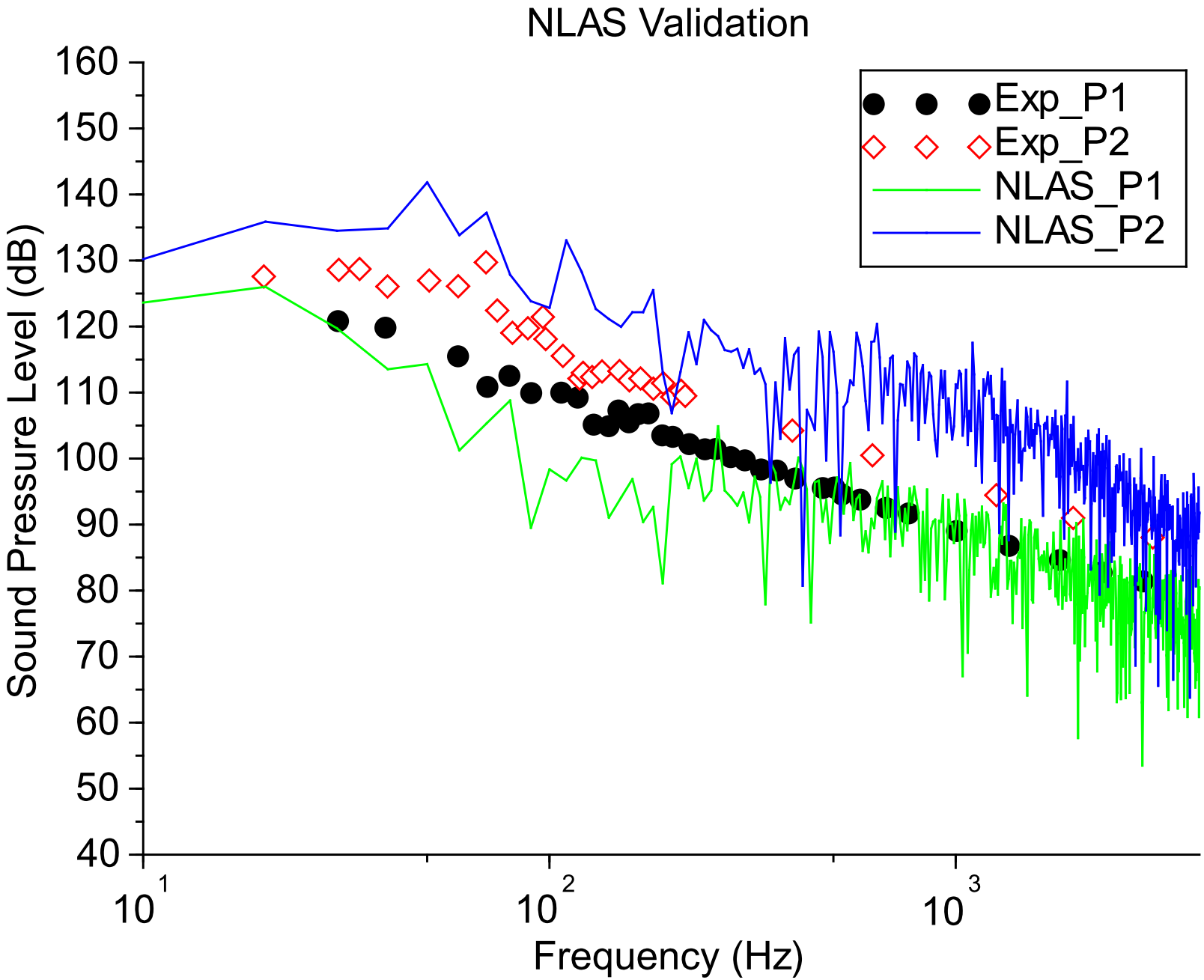
Theorem

I got a theorem...

Proof.

This is the proof details attached in Appendix. □

◂ Return


NLAS Validation
Sound Pressure Level (dB)
160
150
140
130
120
110
100
90
80
70
60
50
40
10^1
10^2
10^3
Frequency (Hz)
Exp_P1
Exp_P2
NLAS_P1
NLAS_P2