Making Slides with Beamer

An Introduction

Jack Quindlen [1]

[1] Aerospace Controls Laboratory, MIT

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Why Use Beamer?

- Easier to write equations and algorithms than Powerpoint
  - Can usually copy and paste directly from your LaTeX papers
- Easier to collaborate
  - No issues like Powerpoint 2012 vs 2014 vs 2016 compatibility
  - Can break up presentation among multiple authors more easily using `\input{}` commands
- Spend less(no?) time reformatting the same material if you reuse it in another presentation
- Who really needs those goofy animations during an actual conference presentation anyways?

Overview

- Basic slides
  - Title slides
  - Ordered lists
  - Figures
  - Columns
- Formatting
  - Headers, footers, sections
  - References and citations
  - Overlays and pauses
- Misc things
  - Input files
  - Math equations/symbols
  - Pop-up text boxes
  - Movies

Before Making Slides

1. Download and install a TeX distribution - here's what I use
   - Windows: MiKTeX- `https://miktex.org/`
   - Ubuntu: TeX Live- "sudo apt-get install texlive-full"
   - These can install packages on the fly when you need new ones
2. Download and install a text editor
   - I use TexWorks- `https://www.tug.org/texworks/`, but there's alot of different options
   - I believe TexLive automatically installs TexWorks, but you can install it from "sudo add-apt-repository ppa:texworks/stable"
   - If you're using TexWorks, you'll also need to install a dictionary. You can find instructions here- http://tex.stackexchange.com

Before Making Slides

- You can download the ACL beamer template off of SVN at: `svn://hohmann.mit.edu/acl/ACL_Beamer_Template/ACL_Beamer_Template.tex`
- In addition to the ".tex" file, you will need to include the following files in the presentation directory
  - "beameroutherthemeACL.sty"
  - "beamerstuff.tex"
  - "beamerthemeACL.sty"
  - "resizer.tex"
  - Which contain the style files that make the ACL theme
- You'll also need to include a "figure" subfolder with two pictures
  - "ACL_logo.jpg"
  - "AO-logo-high_color-top-MIT.jpg"

Making a Title Slide

- Title and subtitle

```
\title[Abbrev. title]{Full title}
\subtitle[]{Full subtitle}
```

- Subtitle is optional
- Abbreviations are also optional:

```
\title[]{Full title}
```

Full title

Full subtitle

Making a Title Slide

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```

Full title

Full subtitle

Making a Title Slide

- Single author

```
\author[abbrev. name]{Your full name}
```

- Including lab affiliations

```
\author[abbrev. name]{Your full name \inst{1}}
\institute[abbrev. lab]{\inst{1} Your affiliation}
```

- Multiple authors and affiliations

```
\author{Name 1 \inst{1}, Name 2\inst{2}, \\ and Name 3\inst{3}}
\institute{\inst{1} One \and \inst{2} Two \and \inst{3} Three}
```

- Add the date (when you compiled the presentation)

```
\date{\today}
```

Full title

Full subtitle

First Author[1], Second Author[2], and Third Author[3]

[1]First author's affiliation

[2]Second author's affiliation

[3]Third author's affiliation

November 2, 2016

Make a Frame (Slide)

- Create a new frame using:

```
\begin{frame}[t]{Frame Title}
%%% Add your stuff here
\end{frame}
```

- For each slide, all your text, figures, and lists have to be within "begin{frame}" and "end{frame}"

- The "[t]" makes the text top-aligned
  - You can also do center-aligned "[c]" and bottom-aligned "[b]"

Make a Frame (Slide)

- The basic slide is an ordered list, which has two versions:
  - Bulleted lists

```
\begin{itemize}
        %%% Your code here
\end{itemize}
```

  - Numbered lists

```
\begin{enumerate}
        %%% Your code here
\end{enumerate}
```

Make a Frame (Slide)

- Both types of lists use the "item" command to add a new bullet/numbered
  - Bulleted lists

```
\begin{itemize}
        \item Your first line of bulleted text
        \item Your second line of bulleted text
\end{itemize}
```

  - Numbered lists

```
\begin{enumerate}
        \item Your first line of numbered text
        \item Your second line of numbered text
\end{enumerate}
```

Make a Frame (Slide)

- Example frame:

```
\begin{frame }[t]{Example Slide}
        \begin{itemize}
                \item Line of bulleted text
                \item Line of bulleted text
        \end{itemize}
        \begin{enumerate}
                \item Line of numbered text
                \item Line of numbered text
        \end{enumerate}
\end{frame }
```

Example Slide

- Line of bulleted text
- Line of bulleted text

1. Line of numbered text
2. Line of numbered text

Make a Frame (Slide)

- Can also make nested lists

```
\begin{itemize}
        \item Line of bulleted text
        \begin{itemize}
                \item Nested bulleted list
        \end{itemize}
        \item Line of bulleted text
        \begin{enumerate}
                \item Nested numbered list
        \end{enumerate}
\end{itemize}
```

Example Slide

- Line of bulleted text
  - Nested bulleted list
- Line of bulleted text
  1. Nested numbered list

1. Line of numbered text
   - Nested bulleted list
2. Line of numbered text
   (a) Nested numbered list

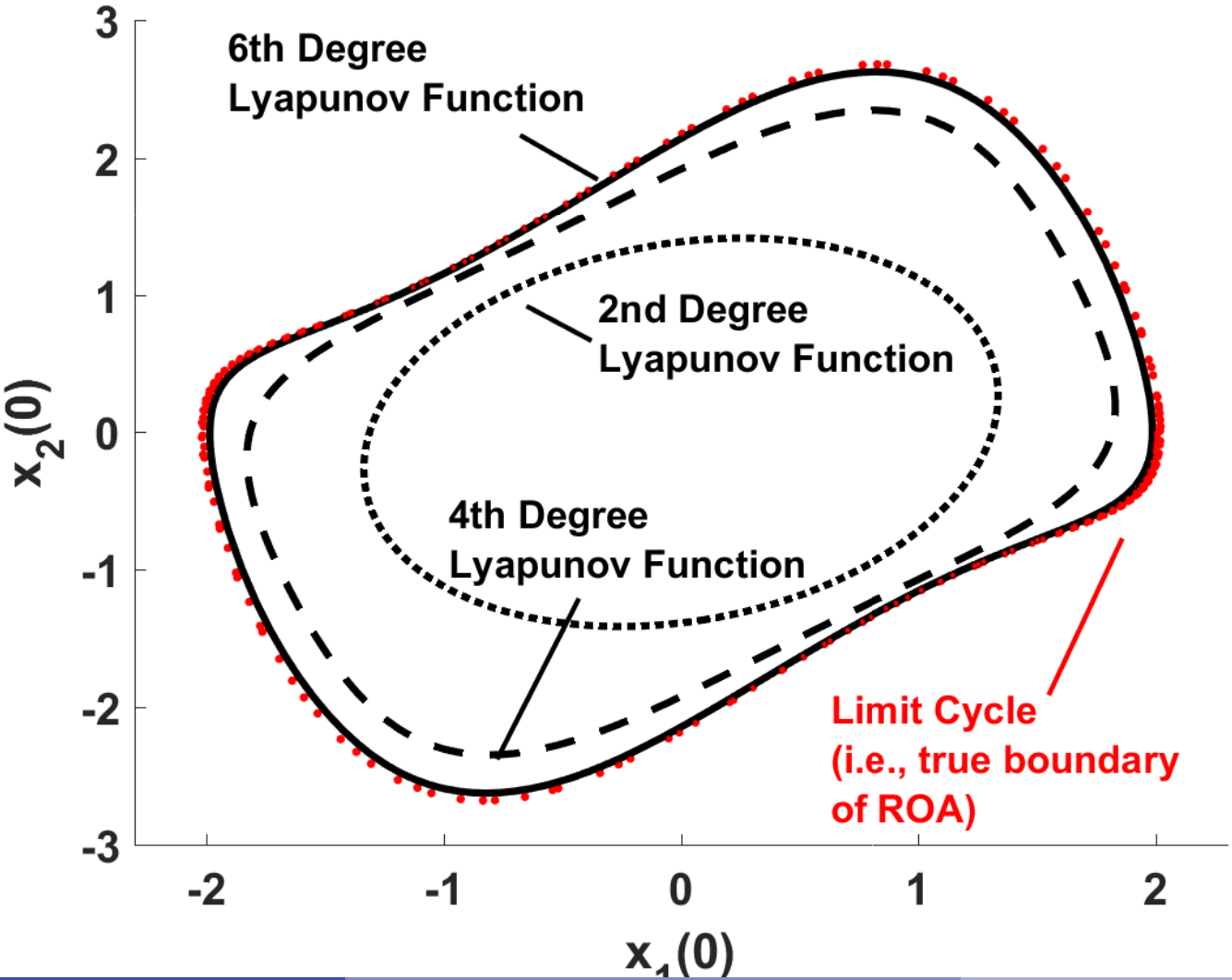
Add Figures to Slides

- Latex and beamer can use many different formats to make figures
  - Ex: pdf, eps, png, jpeg, etc.

- **Aside:** recommend you save figures and graphs as vector graphics (eps, pdf, etc.) whenever possible
  - Does not have the same issue with resolution and scaling as is the case with standard jpeg, png pictures
  - Can save eps figures in Matlab and Python

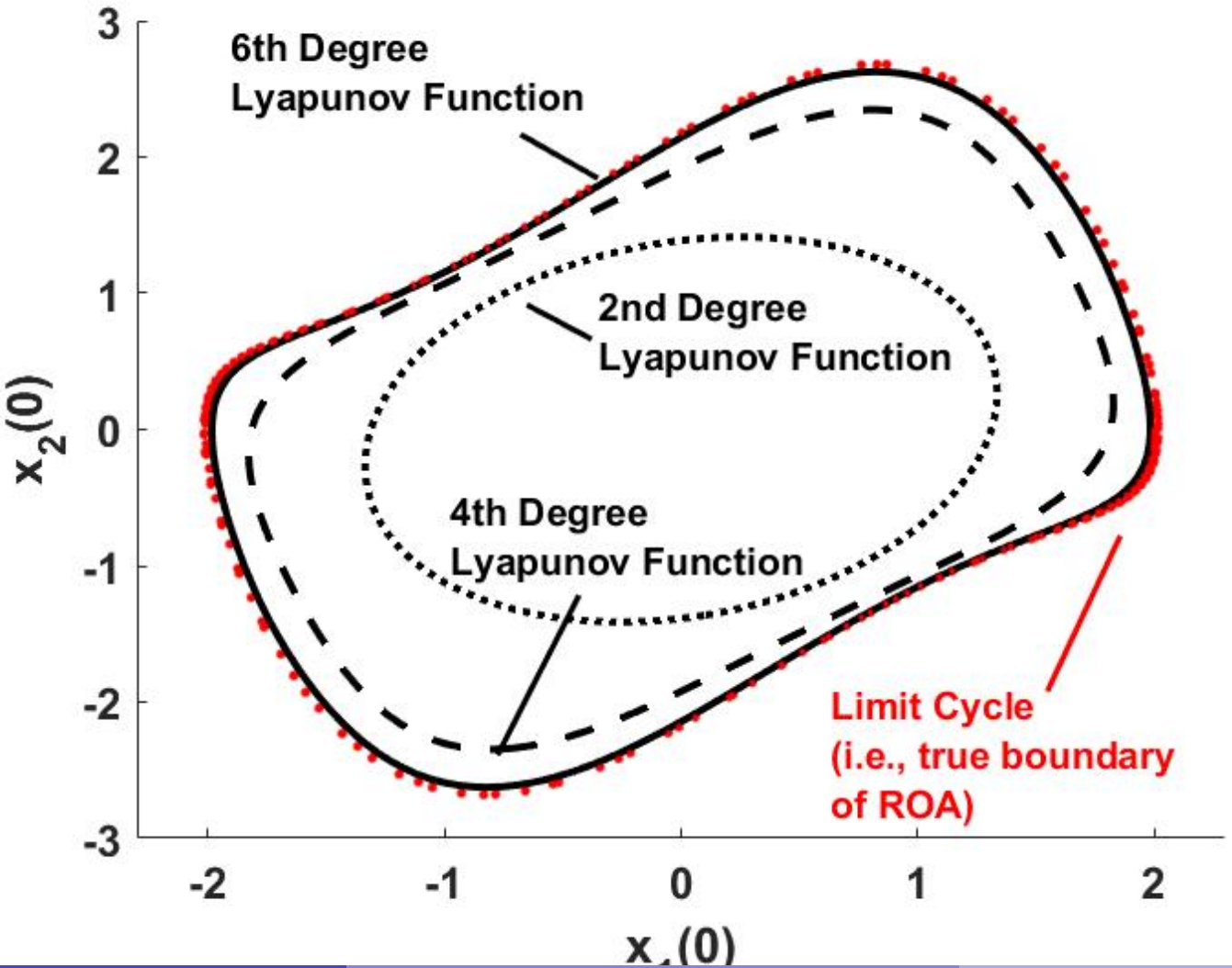
Add Figures to Slides

- EPS file



Add Figures to Slides

- PNG file (should look a little blurrier than the eps version)



Add Figures to Slides

- Add a figure using the command

  `\includegraphics[picture size]{file location}`

  - `[picture size]` - I use the `\columnwidth` command to set width as a decimal $(0, 1]$
    - Ex: `[width = 0.85\columnwidth]` - it scales the height of the figure to match the original aspect ratio
  - `{file location}` - you need to match the file location and extension of the picture file
    - The file location is relative to the main TeX file
    - I typically save my figures in a subfolder labeled "figures"
    - Ex: `{figures/my_figure.eps}`

Add Figures to Slides

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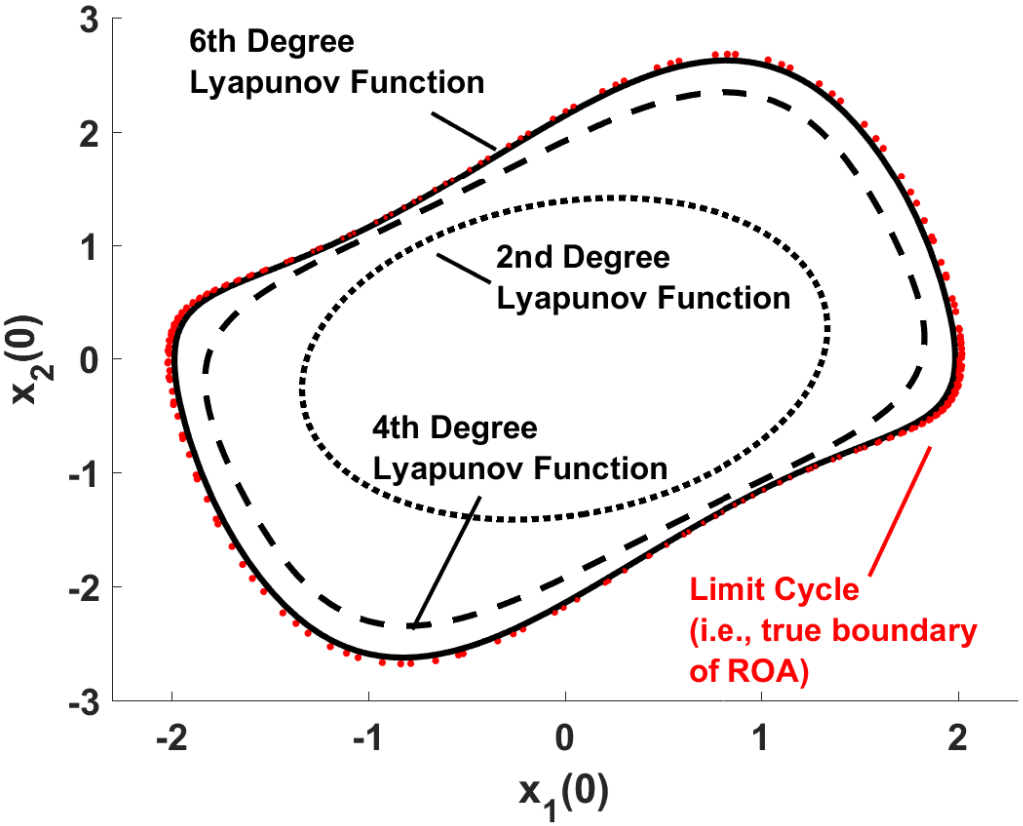
    - The file location is relative to the main TeX file
    - I typically save my figures in a subfolder labeled "figures"
    - Ex: `{figures/my_figure.eps}`
- When appropriate, can center the figure (height and width) using

```
\begin{center}
        \includegraphics[picture size]{file location}
\end{center}
```

Make a Figure

- Here's the sample code to make the following figure

```
\begin{center}
        \includegraphics[width=0.65\columnwidth]{figures/my_figure.eps}
\end{center}
```

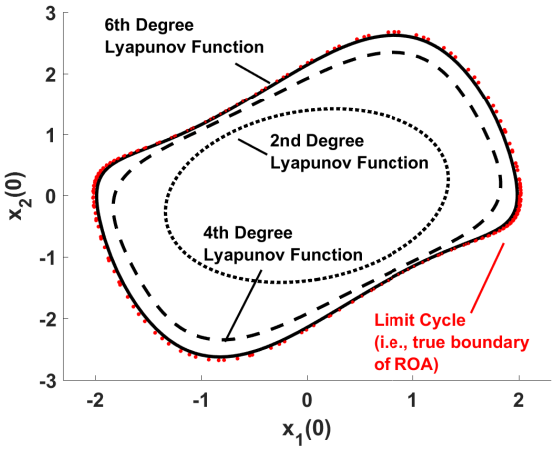


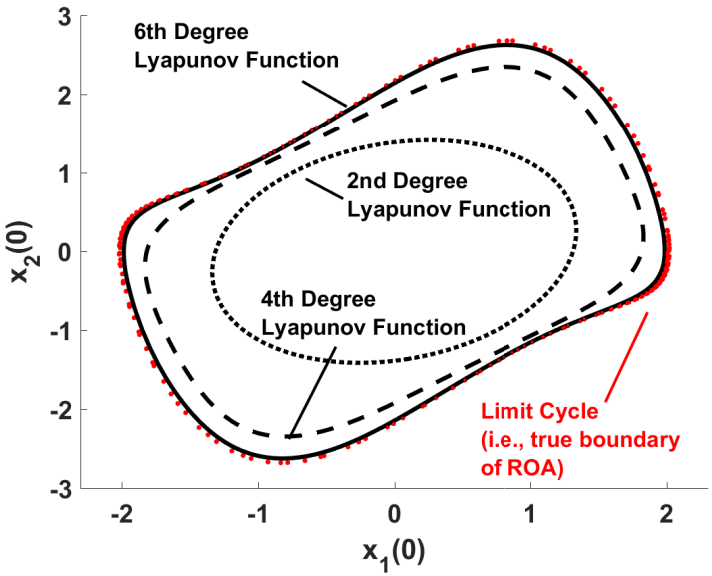
- Note that you can nest the figure within ordered lists too

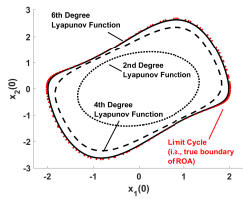
Multiple Figures

- If you want to make multiple figures side-by-side, you can just set the sum of the figures' column widths to be ≤ 1.0

```
\begin{center}
        \includegraphics[width=0.35\columnwidth]{figures/my_figure.eps}
        \includegraphics[width=0.45\columnwidth]{figures/my_figure.eps}
        \includegraphics[width=0.15\columnwidth]{figures/my_figure.eps}
\end{center}
```





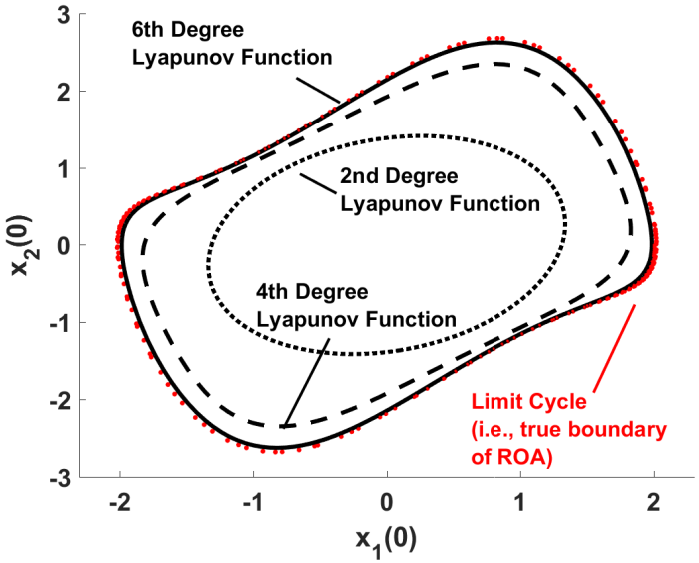


- If the sum is > 1.0 then it will stack them vertically

Making Columns

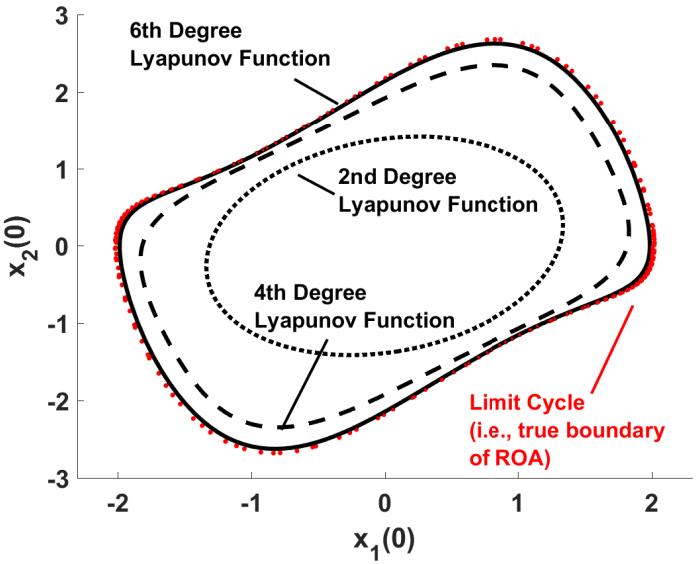
- Sometimes columns are easier for side-by-side text and figures

- Example: text next to a picture
- See how I can use ordered lists just like I did before?
  - All the same formatting rules still apply within a column
- I could have also put the figure on the left and text on the right

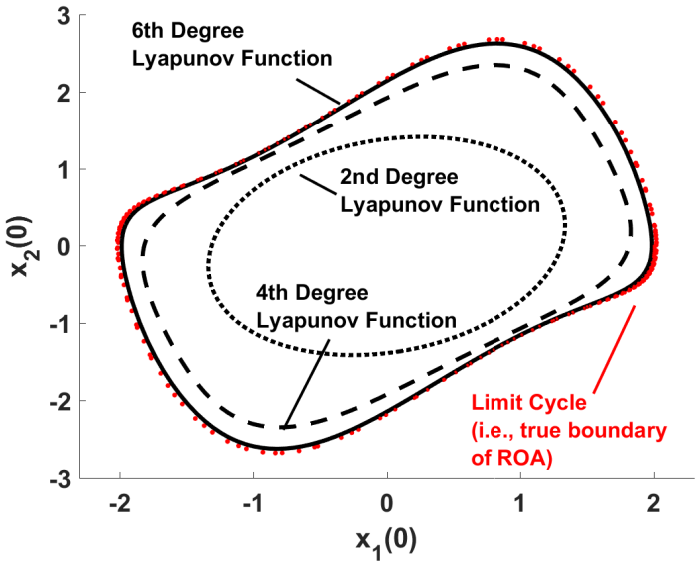


Making Columns

- Sometimes columns are easier for side-by-side text and figures
- Or put two figures next to each other
  - And add a caption



a) caption one



b) caption two

Making Columns

- Here's the sample code to make two columns

```
\begin{columns}
        \begin{column}{0.49\textwidth}
                Add some text here
        \end{column}
        \begin{column}{0.49\textwidth}
                Add a figure here
        \end{column}
\end{columns}
```

Making Columns

- Here's the sample code to make two columns

```
\begin{columns}
        \begin{column}{0.49\textwidth}
                Add some text here
        \end{column}
        \begin{column}{0.49\textwidth}
                Add a figure here
        \end{column}
\end{columns}
```

  - Including an ordered (bulleted) list

```
\begin{column}{0.49\textwidth}
        \begin{itemize}
                \item Add some text here
        \end{itemize}
\end{column}
```

Making Columns

- Here's the sample code to make two columns

```
\begin{columns}
        \begin{column}{0.49\textwidth}
                Add some text here
        \end{column}
        \begin{column}{0.49\textwidth}
                Add a figure here
        \end{column}
\end{columns}
```

  - Including a figure

```
\begin{column}{0.49\textwidth}
        \includegraphics[width=0.9\columnwidth]{figures/
\end{column}
```

Overview

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Adding Headers

- Look at the top of the slide - see the headers?
- These can be controlled using `\section{Add section}` and `\subsection{Add subsection}`
- Use the following code to change the headers

Adding Headers

```
\section{This controls section name}
\subsection{This controls subsection name}
\begin{frame}[t]{Example Slide 1}
        Add your text here
\end{frame }

\subsection{Change subsection name}
\begin{frame}[t]{Example Slide 2}
        Notice the section name didn't change
\end{frame }
```

Example Slide 1

Add your text here

Example Slide 2

Notice the section name didn't change

Changing Frame Number

- By default, the frame number increases with each new frame
- You can manually change the frame counter by positive or negative integers
  - Useful if you want to "freeze" slides or iteratively display things

```
\addtocounter{framenumber}{-1}
\begin{frame}[t]{New slide}
        Notice the frame number didn't change
\end{frame }
```

New slide

Notice the frame number didn't change (bottom right corner)

Adding References

- Two things needed for references
  1. Add a citation in the text
  2. Link to a bibliography (.bibtex) file

1. Add a citation in the text
   - Multiple commands to add citations
   - The `\cite{bibtexkey}` command adds a number: blah blah blah[1]
   - The `\citet{bibtexkey}` command adds a name too: blah blah blah (Omidshafiei et al. [2])
   - You can do other options, but you'll have to go through and add some new packages
   - You can also do multiple in a single call - `\cite{bibtexkey2,bibtexkey3}`: blah blah blah [2, 3]

Adding References

1. Add a citation in the text
2. Link to a bibliography (.bibtex) file
   - Add a bibliography file to the document - I keep mine in a "references" subfolder or something similar
     - Here I used the bibtex file "ACL_publications.bib"
   - Also need to specify a bibliography style, ex: "unstr"
   - I usually place the link to the bibliography file at the very end of the document
   - Here's the sample code used at the end of this presentation

```
\begin{frame}[allowframebreaks]{References}
\bibliographystyle{unsrt}
\bibliography{references/ACL_publications}
\end{frame }
\end{document}
```

References I

[1] Miao Liu, Christopher Amato, Emily P Anesta, J Daniel Griffith, and Jonathan P How. Learning for decentralized control of multiagent systems in large, partially-observable stochastic environments. In *Thirtieth AAAI Conference on Artificial Intelligence*, 2016.

[2] Shayegan Omidshafiei, Brett T. Lopez, Jonathan P. How, and John Vian. Hierarchical bayesian noise inference for robust real-time probabilistic object classification. Technical report, 2016. `http://arxiv.org/abs/1605.01042`.

[3] John F. Quindlen, Ufuk Topcu, Girish Chowdhary, and Jonathan P. How. Region-of-Convergence Estimation for Learning-Based Adaptive Controllers. In *American Control Conference*, 2016.

Making References

- The previous slides showed how to add citations and link to a bibliography file, but you must first create that bibliography file
  - There's already some bibliography files for the lab's own paper: `svn://acl.mit.edu/acl/BIB_all/ACL_Publications.bib`
- If you want to make your own bibliography you can use software such as JabRef to organize your files more easily
- Especially if you're putting them into the ACL-common files, use the following style for your BibTex key:
  - "Last Name + Year (last two digits) + _ + Journal/Conference Initials"
  - Example: "Jack Quindlen" + "2016" + "American Control Conference" = "Quindlen16_ACC"

Adding Overlays

- Here's how you can overlay text
- So that you can leave it temporarily blurred out
- One of the easiest ways to do so is with the \pause command
  - Here's the code I just used:

```
\item Here's how you can overlay text
\pause
\item So that you can leave it temporarily blurred out
\pause
\item One of the easiest ways to do so is with the
```

  - Each \pause command hides the text that follows and they stack upon each other

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Adding Overlays

- Another way to do it is within the itemize framework
- When you command `\item`, you can specify in which frame(s) the text will be displayed
  - You just have to add "<frame number(s)>" immediately after `\item`
  - Example: `\item<2>` will only display the text in the second frame
  - You can also make them stay visible using a hyphen
  - Example: `\item<2->` will display the text in the second and all subsequent frames
- You can also use that to make text disappear
  - See what just happened with the first bullet point?
  - I used `\item<1-4>` to make it disappear after the fourth frame

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Adding Overlays

- Lastly, another simple option is to just make two copies of the same slide, one with additional material
  - Can use the `\addtocounter{framenumber}{-1}` command we discussed to freeze the frame counter
  - This is particularly useful when you have figures because the previous two methods have problems
- You can also try more advanced commands such as `\only<2->` or `\visible<2->` or `\uncover<2->`
  - They all have their own nuances, Google it if you think you need to use them

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Spaces

- If you want to add extra white space (or subtract some) you can use the `\vspace{xyz}` and `\hspace{xyx}` commands
  - You can use units of "pts" (as in font size), "in" for inches, or "cm" for centimeters
  - Example: `\vspace{0.2in}` for 0.2 inch or `\vspace{12pt}` for 12 points
- `\vspace{xyz}` controls the vertical spacing
  - Using positive values adds extra white space between lines
  - Using negative values shrinks the white space between lines/objects
  - You can also add "\\" to the end of a line to force a new line
- `\hspace{xyz}` controls the horizontal spacing
  - Using positive values pushes text right

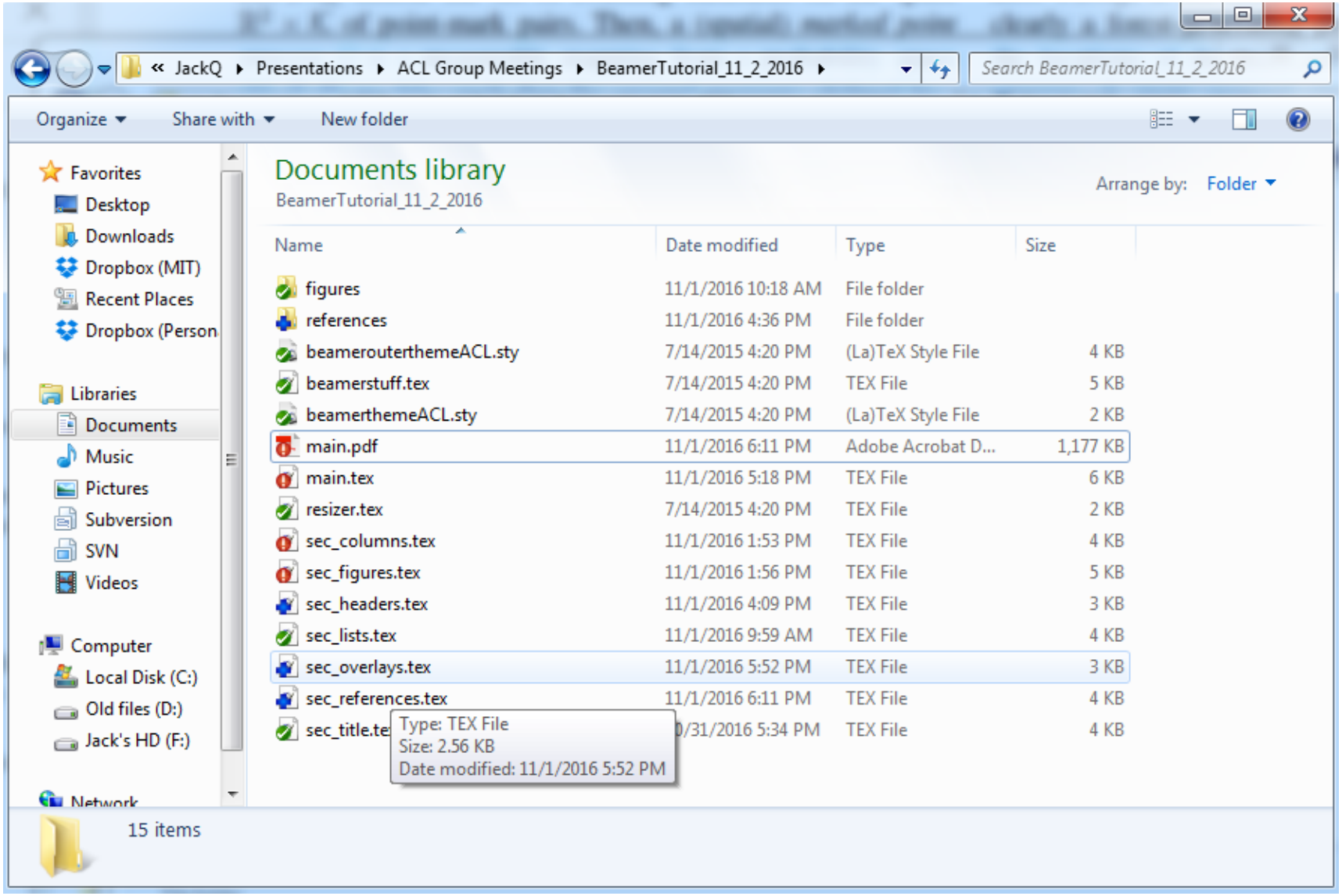
Using negative values pushes text left
  - You can also add an extra spacebar using a backslash "\"

Input Files

- When dealing with large presentations, it can become difficult to use a single .tex file
  - Instead use `\input{filename}` to break up one file into several
- I use a single "root" file titled "main.tex" that calls several input files, labeled something like "sec_blahblahblah.tex"
- Nothing new is needed in the input file - no special "begin" etc - just start making frames as you would otherwise
- All you need is a command `\input{sec_blahblahblah}` in the root folder - it will include all the frames in "sec_blahblahblah" before the next set of slides

```
\begin{frame}[t]{This is the 1st slide}
        Blah blah blah
\end{frame }
\input{sec_TenSlides} %insert the 10 slides specified by the file ''sec_TenSlides.tex''
\input{sec_FiveSlides} %insert the 5 slides specified by the file ''sec_FiveSlides.tex''
\begin{frame}[t]{This is the 17th slide}
        Blah blah blah
\end{frame }
```

Input Files


« JackQ ▸ Presentations ▸ ACL Group Meetings ▸ BeamerTutorial_11_2_2016 ▸
Search BeamerTutorial_11_2_2016
Organize
Share with
New folder
Favorites
Desktop
Downloads
Dropbox (MIT)
Recent Places
Dropbox (Person
Libraries
Documents
Music
Pictures
Subversion
SVN
Videos
Computer
Local Disk (C:)
Old files (D:)
Jack's HD (F:)
Network
Documents library
BeamerTutorial_11_2_2016
Arrange by: Folder
Name
Date modified
Type
Size
figures 11/1/2016 10:18 AM File folder
references 11/1/2016 4:36 PM File folder
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sec_title.te 0/31/2016 5:34 PM TEX File 4 KB
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15 items

Math Equations/Symbols

- No modifications have to be made to write mathematical equations or symbols while operating in beamer

```
\begin{frame}[t]{Math Equations}
        You can still add math symbols to sentences
        by using dollar signs\\
        like this $1 + 1 = \alpha$ \\
\vspace{0.2in}
        And use equations in the same way like
        \begin{equation}
                1 + 1 = \alpha
        \end{equation}
\end{frame }
```

- Check out HERE and HERE if you don't know LaTeX math

Pop-Up Text Blocks

- You can hard code pop-up text blocks
  - You'll have to include the following code immediately following the other packages at the beginning of the document

```
\usepackage[absolute,overlay]{textpos}
\newenvironment{myfootnote}[3]{%
\begin{textblock*}{#3}(#1,#2)
\tiny\begingroup\color{blue!50!black}}{\endgroup\end{textblock*}}
```

  - Then you'll create a textbox using

```
\only<2->{
\begin{textblock*}{0.99\textwidth}(0.05\textwidth,37ex)
        \begin{block}{Textbox title}
                Whatever you say in the textbox
        \end{block}
\end{textblock*}
}
```

    - The `\only<2->` command makes the textbox only popup in the second frame
    - The line `\begin{textblock*}{0.99\textwidth}(0.05\textwidth,37ex)` sets {width of textblock}(distance from left of page, distance from top of page)

Pop-Up Text Blocks

- You can hard code pop up text blocks

Textbox title

- It does something like this!
- Notice that I can do all the other commands (like bulleted lists) in here too!

- Then you'll create a textbox using

```
\only<2->{
\begin{textblock*}{0.99\textwidth}(0.05\textwidth,37ex)
        \begin{block}{Textbox title}
                Whatever you say in the textbox
        \end{block}
\end{textblock*}
}
```

  - The `\only<2->` command makes the textbox only popup in the second frame
  - The line `\begin{textblock*}{0.99\textwidth}(0.05\textwidth,37ex)` sets {width of textblock}(distance from left of page, distance from top of page)

Adding Movies

- You can also add movies to beamer presentations
  1. Embed Youtube links
  2. Embed local videos stored on your hard drive

- I took these slides from my earlier presentation
  - I didn't include local videos
  - You can find that complete presentation here
    `svn://acl.mit.edu/acl/ACL_Beamer_Template/movie_making.tex`

Notes

- **Intro**: you should use this as a template for embedding videos. Copy and paste it into your code as necessary
- I've tested this on both Windows and Ubuntu
  - Depending on your compiler, you might not be able to see the videos in your compiler's display, but you can view it when you open it in Adobe Reader/Acrobat
- **However**, I have not been able to get the videos to display properly in Ubuntu
  - It correctly compiles - the videos are embedded, but the presentation software can't display it
  - I've tried Adobe Reader 9, Okular in Ubuntu but have not been able to get videos to display properly
  - Feel free to edit this if you do get it to work!

Notes

- Two ways to embed videos in your presentation:
  1. Youtube (or whatever else) links embedded in the player
  2. Local files on your hard drive
- This uses the media9 package. You have to make sure it's added - see line 18 of the TeX code
- Start with Youtube videos

Youtube Video

- This is the baseline example

Youtube Video

- This removes the title bar from the top of the video

Youtube Video

- **Important notes:**
  - If you copy the URL straight from your browser, the link will look like: `https://www.youtube.com/watch?v=opsmd5yuBF0`
  - But you can't use that link - you need to replace ".../watch?v=..." with ".../v/..."
  - When you copy your link into the beamer code, that same link will now look like: `https://www.youtube.com/v/opsmd5yuBF0`
  - You can also add "rel=0" to prevent the related videos from showing up at the end. New url would look like: `https://www.youtube.com/v/opsmd5yuBF0?rel=0`

Making Slides with Beamer

An Introduction

Jack Quindlen [1]

[1] Aerospace Controls Laboratory, MIT

November 2, 2016

References I

[1] Miao Liu, Christopher Amato, Emily P Anesta, J Daniel Griffith, and Jonathan P How. Learning for decentralized control of multiagent systems in large, partially-observable stochastic environments. In *Thirtieth AAAI Conference on Artificial Intelligence*, 2016.

[2] Shayegan Omidshafiei, Brett T. Lopez, Jonathan P. How, and John Vian. Hierarchical bayesian noise inference for robust real-time probabilistic object classification. Technical report, 2016. `http://arxiv.org/abs/1605.01042`.

[3] John F. Quindlen, Ufuk Topcu, Girish Chowdhary, and Jonathan P. How. Region-of-Convergence Estimation for Learning-Based Adaptive Controllers. In *American Control Conference*, 2016.