Math 291: Lecture 9

Dr. Fagerstrom

Minnesota State University Moorhead
web.mnstate.edu/fagerstrom
fagerstrom@mnstate.edu

March 22, 2018

Outline

Building Bibliographies

- LaTeX has a related program called BibTeX that will automatically build bibliographies, including their references within a document.

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- BibTeX requires both a *separate* file with a .bib extension and using the BibTeX build command as well as LaTeX.

Creating .bib entries

There are several different types of bibliographic entries. Standard ones are:

- article (requires: author, title, journal, year)
- book (requires: author or editor, title, publisher, year)
- inbook (requires: author or editor, title, chapter and/or pages, publisher, year)
- misc (optional: author, title, howpublished, month, year, note, key (for alphabetizing))

For a fuller list, and other detailed information, see:
http://bibliographic.openoffice.org/bibtex-defs.html

Creating the .bib file

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MathSciNet is a fairly comprehensive reference archive for articles in mathematical journals. (Use it on campus – it is not free!)
To start, first download and open the file 2018-291-Week9ExampleBib.bib from my webpage.

Creating the .bib file

(1) Go to MathSciNet: http://www.ams.org/mathscinet/search.html

(2) Do a **publications** search by typing in the name of your favorite author (Fulghesu).

(3) Check a couple of boxes.

(4) In the pull-down menu, change it to: Citations (BibTeX).

(5) Choose: Retrieve Marked.

(6) Open ExampleBibLecture.bib

(7) Copy and paste these into the example .bib file. (Presumably at the end of it.)

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- Typically, we will change this to a tag that is easier to remember and reference, as I did in the example .bib file. For example, Fulghesu2012 and Fulghesu2010.

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Any field in a .bib reference that is neither required nor optional is ignored - so you may include whatever you want in your .bib entries.

Using the .bib file

To generate a bibliography, at the very end of your .tex file (just prior to the \end{document}), add the following commands:

```
\bibliographystyle{plain}
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`\bibliographystyle{plain}`

`\bibliography{NameOfBibFile}` (Do not include the .bib extension in the file name.)

Running BibTeX

- You will need to compile your main document four times:
  1. Run LaTeX (regular build)
  2. Run BibTeX (from the pull-down menus: Build - Current File - BibTeX)
  3. Run LaTeX
  4. Run LaTeX

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- In the bibliography in your final document, only those papers actually cited appear. And we haven't yet cited anything.
- Your .bib file can contain (and often does) any paper you've ever referenced. You just continue adding references as needed. (Note: This is one realization of the 'mathematicians are lazy' rule.)

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- To refer to one of our bibliographic references in a document, we use the command:
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- To refer to one of our bibliographic references in a document, we use the command:
- `\cite{CitationKey}`
- Practice by adding a citation referencing the sources Goyt2010 and Hawking2008 from the .bib file.

Bibliography styles

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- Common bibliography styles are:
  - plain
  - alpha
  - unsrt
  - abbrv
- There are other styles. Google it!

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- You might also want to investigate the commands `\begin{thebibliography}` and `\bibitem` for use without a .bib file.
- But note that most mathematicians just use their lifetime-global list (again, the 'mathematicians are lazy' rule...).

Bibliographies

- As mentioned earlier, only references that are actually cited appear in the Bibliography.
- You can get an individual reference to appear without citing it by using

  ```
  \nocite{key}
  ```

- If you want to see every item in your Bibliography (sometimes used to find a particular item), you can use

  ```
  \nocite{*}
  ```

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  - In the context menu, choose "Export".

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  - In the context menu, choose "Export".
  - Then choose the file type ".eps" ("encapsulated postscript").

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- We are going to include the image file: "Bat.eps" in our document.
  - It will be based on a graph created using Maple
  - Open the file "Bat.mw", then right-click on the graph.
  - In the context menu, choose "Export".
  - Then choose the file type ".eps" ("encapsulated postscript").
  - Save the resulting file as bat.eps in the same folder as your current document (the compiler will only be able to find graphics files in the same folder).

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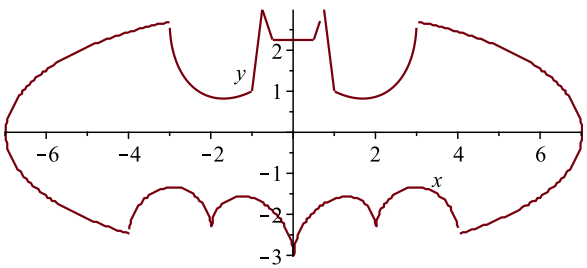

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Creating Postscript Graphics: Lines

- Copy the contents from the file `smallgraph.tex` into your practice file.
  - These commands create a square grid going up to 5 units from the origin.
  - The `largegraph.tex` files gives you one that goes 10 units from the origin.
- Just prior to the `\end{pspicture}` command, use the `\psline` command to create a straight line from $(-3, 2)$ to $(4, 1)$:

```
\psline[linewidth=3pt,linecolor=blue,
arrowsize=10pt,dotsize=10pt]{<-*}(-3,2)(4,1)
```

Creating Postscript Graphics: Lines

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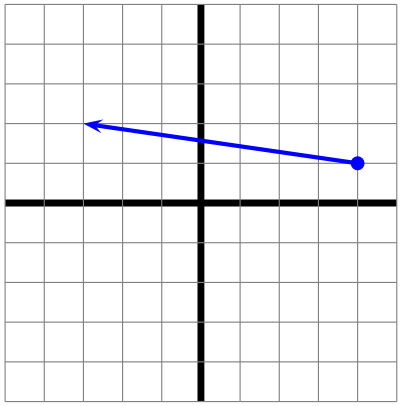
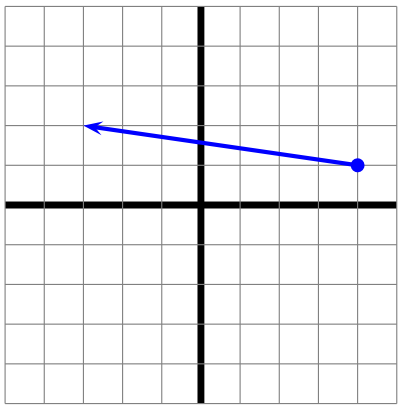
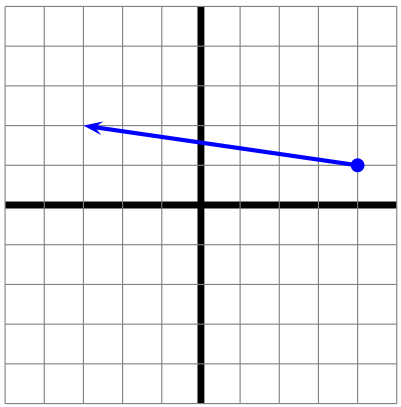


Creating Postscript Graphics: Lines

- You should see: 
- See what happens if you change the symbols $<$ and $*$ into $<$, $>$, $*$, or o.

Creating Postscript Graphics: Lines



- You should see:
- See what happens if you change the symbols $<$ and $*$ into $<$, $>$, $*$, or o.
- Then, see what happens if you add more ordered pairs to the list in your line command.

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- Compile and see what the graphic looks like.

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- In the command above, add points until you have 5 or 6 of them, and change the `\psline` command into `\pscurve`.
- Compile and see what the graphic looks like.
- Notice that this command draws a curve fitting the points you supplied, in the exact order that you supplied them.

Creating Postscript Graphics: Curves

- The following is the command for graphing the function (on the large grid) $f(x) = \frac{1}{12}x^4 - \frac{1}{6}x^3 - 3x^2 - 1$, with the y-scale being 5 units per grid line.

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```
\pscurve[linewidth=1.2pt,arrowsize=10pt]{<->}
(-6.27,10)(-5.95,6.547)(-4.89,-1.10)(-3.56,-3.624)
(-2,-2.067)(0,-.2)(1.277,-1.203)(3,-5.15)(4.04,-7.76)
(5.06,-8.954)(5.745,-8.17)(6.81,-2.72)(7.234,1.425)
(7.65,6.99)(7.8,10)
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```

- The points used were found by evaluating the function $f(x)$ at various inputs (and rounding the results).

Creating Postscript Graphics: Curves

- The following is the result of adding the previous pscurve command at the end of the "largegraph" command file:

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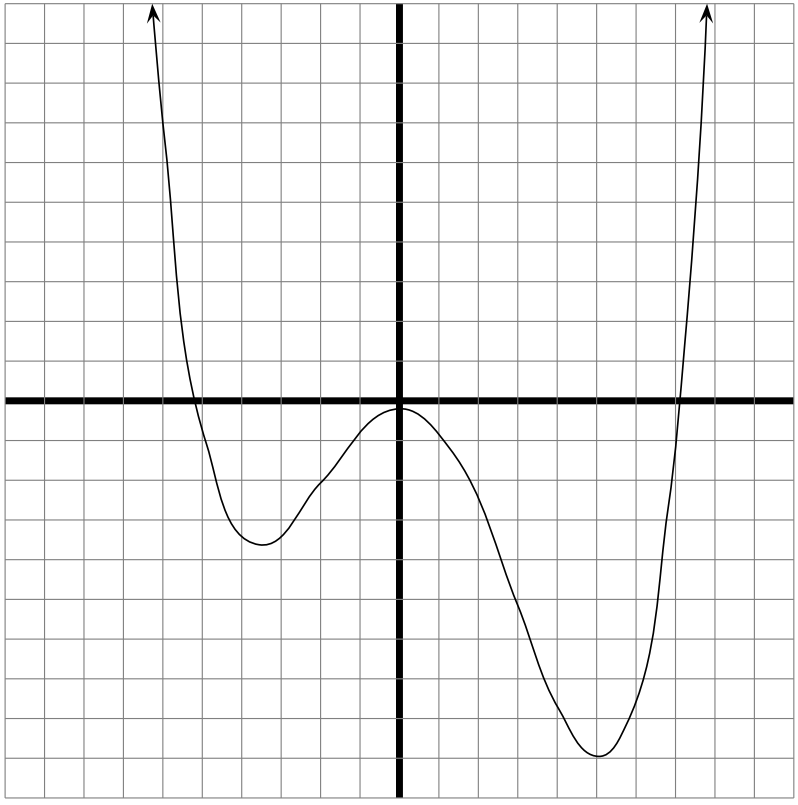


Other Shapes Available for PS Graphics

The following is a list of some other commands.

- `\psdots[...](x,y)` [or `\psdot` for just one].
- `\psframe[...](x0,y0)(x1,y1)`
- `\psdiamond[...](h,k)(x-length,y-length)`
- `\pscircle[...](h,k){r}`
- `\psellipse[...](h,k)(x-length,y-length)`
- `\pswedge[...](h,k){r}{start-angle}{end-angle}`
- `\parabola[...](x0,y0)(h,k)`
- `\psarc[...](h,k){r}{start-angle}{end-angle}`
- `\psbezier[...](x1,y1)(x2,y2)(x3,y3)(x4,y4)`
- `\pspolygon[...](supply n ordered pairs)`
- `\pstriangle[...](x0,y0)(x1,y1)`
  isosceles, base centered at $(x0, y0)$, base length $x1$, height $y1$

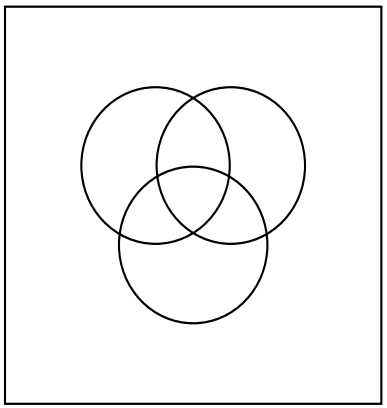
Postscript Graphics Options

Some options that can be used to modify PS Graphics:

- linewidth=(number), linecolor=color, arrowsize=(number), dotsize=(number), arrowlength=(number)
- Colors: black, darkgray, gray, lightgray, white, red, green, blue, cyan, magenta, yellow, or
  - `\definecolor{name}{rgb}{# # #}`, where each # $\in [0, 1]$
- Line terminators: $-$, $<$, $>$, $<<$, $>>$, (,), |, [,], o, $*$, | $<$, $>$ |, c
- doubleline=true (and then doublesep=(number))
- linestyle=solid, dashed, dotted, none
- dotstyle=$*$, $+$, |, o, x, asterisk, diamond*, diamond, oplus, otimes, pentagon*, pentagon, square*, square, triangle*, triangle
- linearc=(number) showpoints=true/false
- fillstyle=none, solid, vlines, vlines*, hlines, hlines*, crosshatch, crosshatch*, (and gradient, with pst-grad package)
- fillcolor=...

Postscript Graphics Options - Example

- To see an example of how to use some of these commands, we will build a Venn diagram:
- The following commands create an empty 3-circle Venn diagram:



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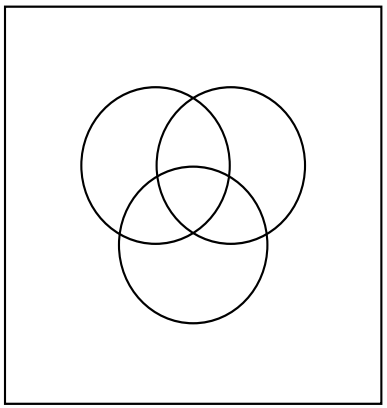
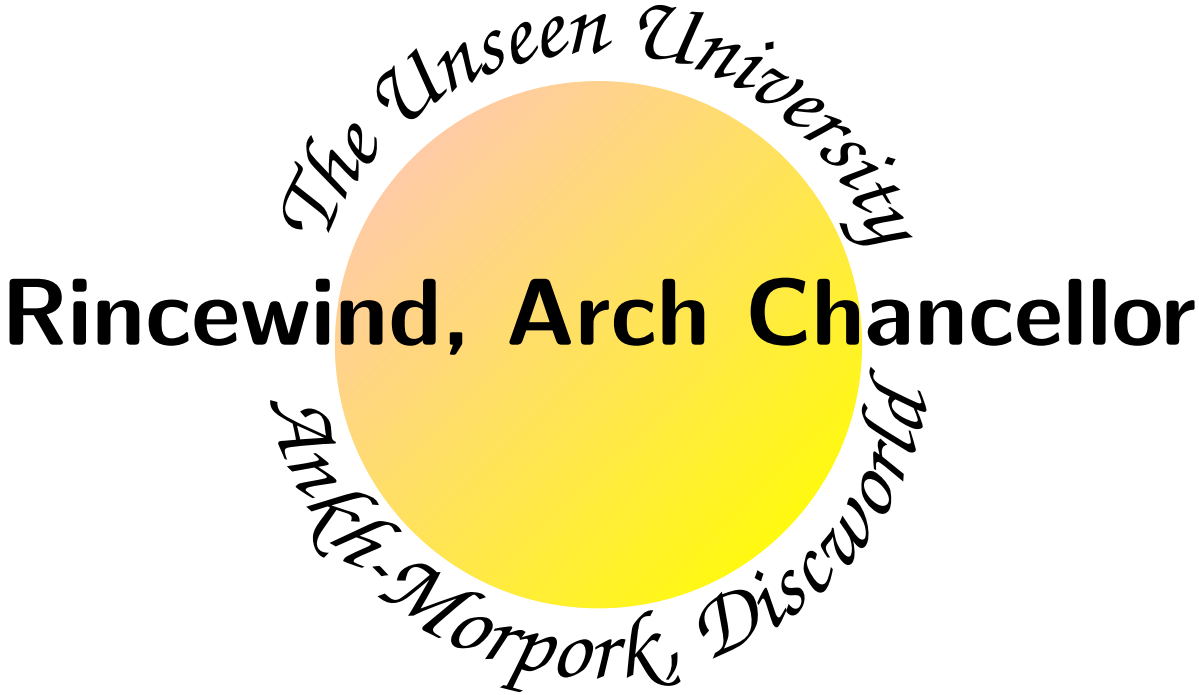


```
\begin{pspicture}(0,0)(5,5)
\pspolygon(0,0)(5,0)(5,5)(0,5)(0,0)
\pscircle(2,3){1}
\pscircle(3,3){1}
\pscircle(2.5,2){1}
\end{pspicture}
```

Text with graphics

We can also mix text with graphics, as in the following "University Seal".

Packages needed: pst-text, pst-grad, pstricks



Text with graphics

Note: Lines that start with % are comments (and % is the character for commenting out a line that you don't want the computer to try to compile).

```
\definecolor{pink}{rgb}{1, .75, .8}
\begin{pspicture}(-3,-2.2)(3,2.2)
\psset{linestyle=none}
%Note:  This just makes it so that we don't have to say it all the time
\newcommand{\curly}[1]{{\fontfamily{pzc}\fontsize{17}{17}\itshape#1}}
%This is defining a new font for our "University Seal"

\pstextpath[c]{\psarcn(0,0){2}{180}{0}}{\curly{The Unseen University}}
%\pstextpath[alignment, c=centered]{path to follow}{Text to put on the path}
\pstextpath[c]{\psarc(0,0){2}{180}{0}}{\curly{Ankh-Morpork, Discworld}}
%The difference between arc and arcn is the direction traversed
\pscircle[fillstyle=gradient,gradangle=45,gradbegin=pink,gradend=yellow](0,0){1.7}
\rput[B](0,0){{\Large \itshape \bfseries Rincewind, Arch Chancellor}}
%rput puts the given whatever at the starting point at the
%reference point in the [..].
%B stands for baseline (also l,r,t,b for left, right, top, bottom)
\end{pspicture}
```