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Computational Mechanics

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Creating Labeled "Stand-Alone" Figures in LaTeX Using WARMreader and Adobe Illustrator Under Mac OS X

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Motivation

- We like labeling our figures using LaTeX fonts — for us, this means Computer Modern or Lucida.
  - Label fonts match the text and one can label figures using complex mathematical structures.
- By labeling properly, one can create *independent* figures that can be printed or used by anyone, whether or not they have LaTeX.
- Our switch to a Classic-free environment required us to abandon our old solution.

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The Switch to Mac OS X

- Uneventful until it was time to label figures.
- We tried our old solution, i.e., create a LaTeX document with *just* the figure labels, save it as EPS or PDF, and then open it in Illustrator.
  - It isn't pretty when you do this — Illustrator substitutes for every character.
- We then found `WARMreader`, a package by Ross Moore and Wendy McKay.

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The WARMreader Package

- Allows one to overlay graphics objects with LaTeX labels that are defined in the very LaTeX file in which the graphics are to be imported.
  - Provide and extend the capabilities of Xy-pic and PSfrag.
- Does this by writing coordinates, measured WRT the lower-left corner of the object, to a .bb file.
- Greatly facilitated in Adobe Illustrator due to Tom Ruark's MarkedObjects plug-in.

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WARMreader and Stand-Alone Figures

- WARMreader can only be used from within LaTeX, so how does one create stand-alone figures?
  - *Need to extract the labeled figure out of the document and endow it with the proper bounding box.*
- The strategy for doing this is now presented — this is *not* the procedure presented in the paper!

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Stand-Alone EPS File

1. Create an AI file that has used the `MO` plug-in to add the LaTeX labels. Save as `.eps` and `.pdf`.

2. Create a single-page LaTeX doc containing *only* the labeled graphic, typeset using TeX + Ghostscript, and save the resulting `.ps` file.

3. Parse the `.ps` file for the bounding box of the labeled graphic.

4. Insert the bounding box into the `.ps` file and rename it to `.eps`.

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Stand-Alone PDF File

5. Parse the `.pdf` file saved out of Illustrator for its bounding box. This will be used as the `viewport` when the `.pdf` has labels applied.
6. Typeset a second `.tex` file that now includes the Illustrator PDF file. Use the bounding box from the original `.ps` to insert it as the `CropBox` in the resulting `.pdf` file.
7. Delete all unnecessary files.

We have written an AppleScript that automates this rather involved procedure.

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WARMFIGTOPDF

AI + MO plug-in, along with the WARMFIGTOPDF AppleScript, automates this process by:

- creating the `.bb` file,
- creating the `.tex` file for placing the labels using `WARMreader`,
- parsing for bounding boxes, creating and cropping the EPS and PDF files, renaming files, and doing a final clean-up.

An outline of the precise steps performed by the user follows …

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WARMFIGTOPDF Requirements

- Mac OS X 10.2.X.
- TEXShop or similar app that generates the `.ps` file when typesetting.
- teTEX, including Ghostscript 8.
- Adobe Illustrator 10 and the MO plug-in.
- `WARMreader` 1.2.
- WARMFIGTOPDF 1 or 2.

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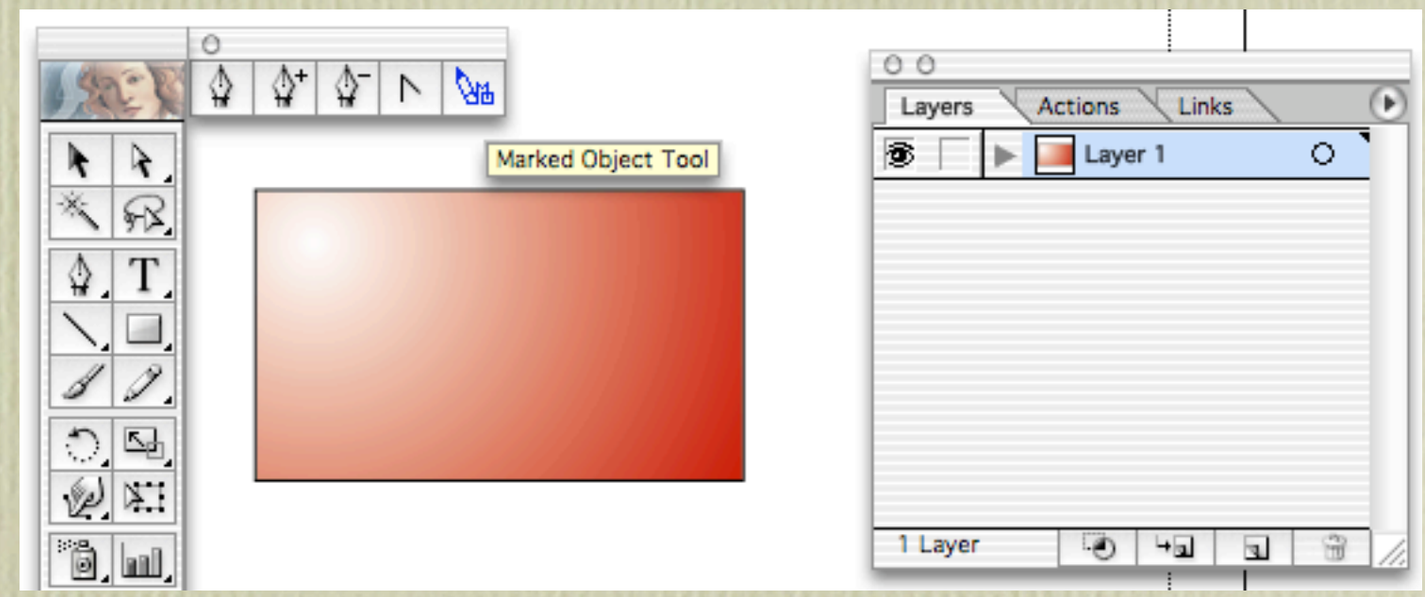
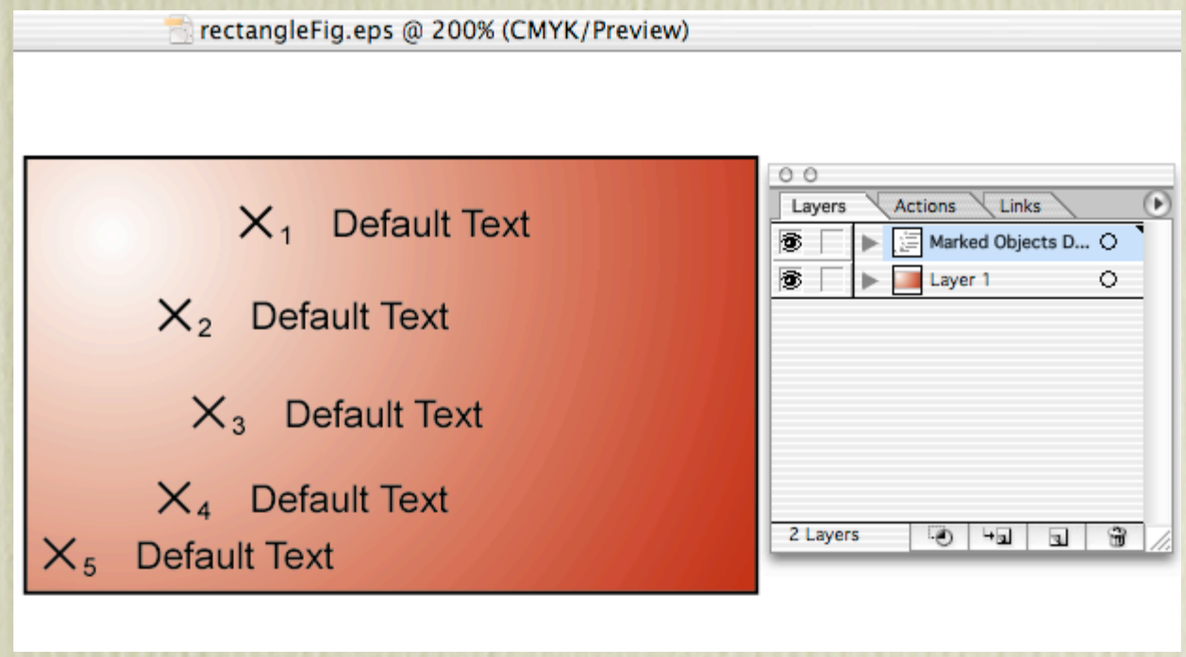
AI: Adding MOs



Draw the desired object in AI.

Add the MOs using the MO tool.



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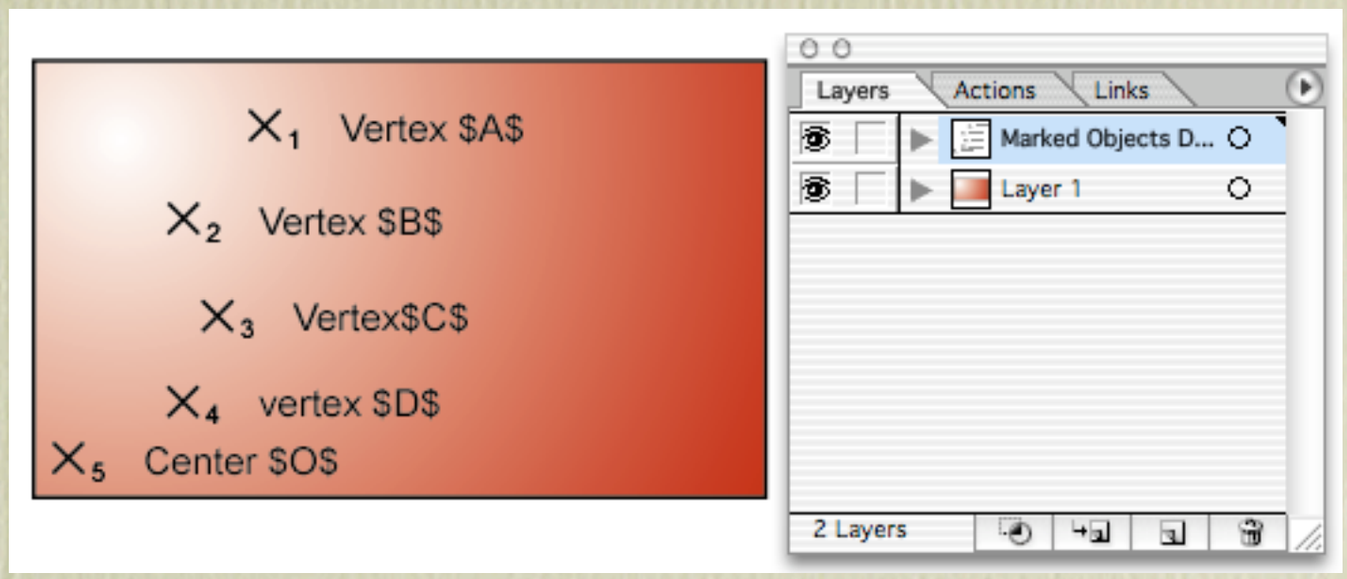
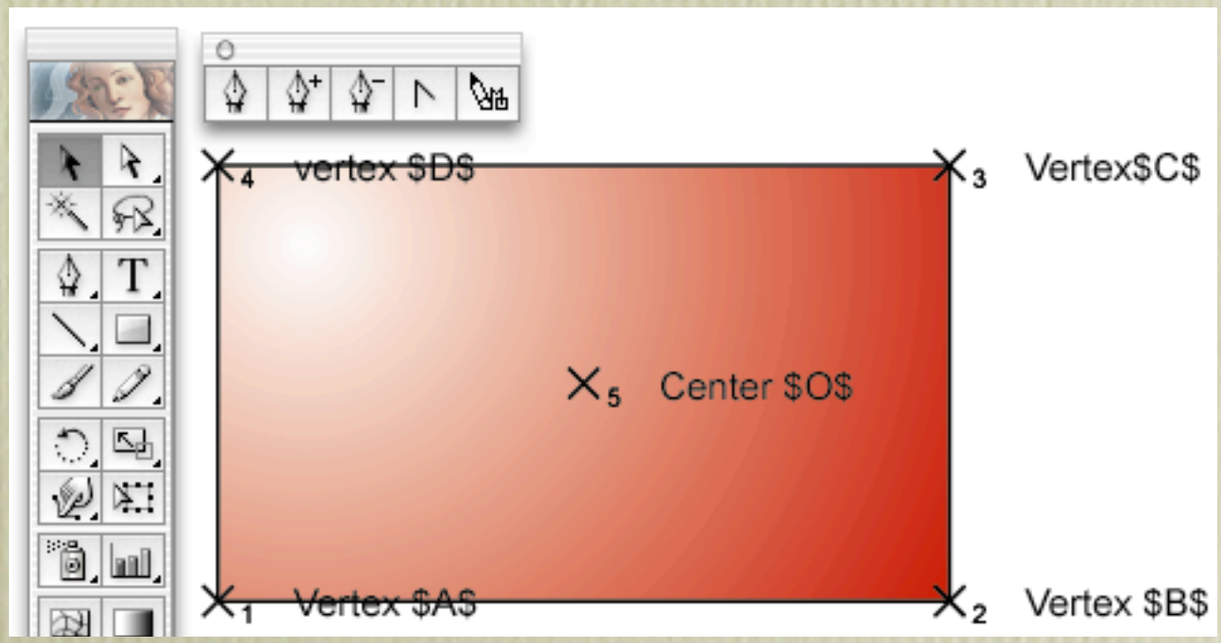
Modifying MOs

Change the text in each MO using the AI Text tool.





Move the MOs to the desired location.

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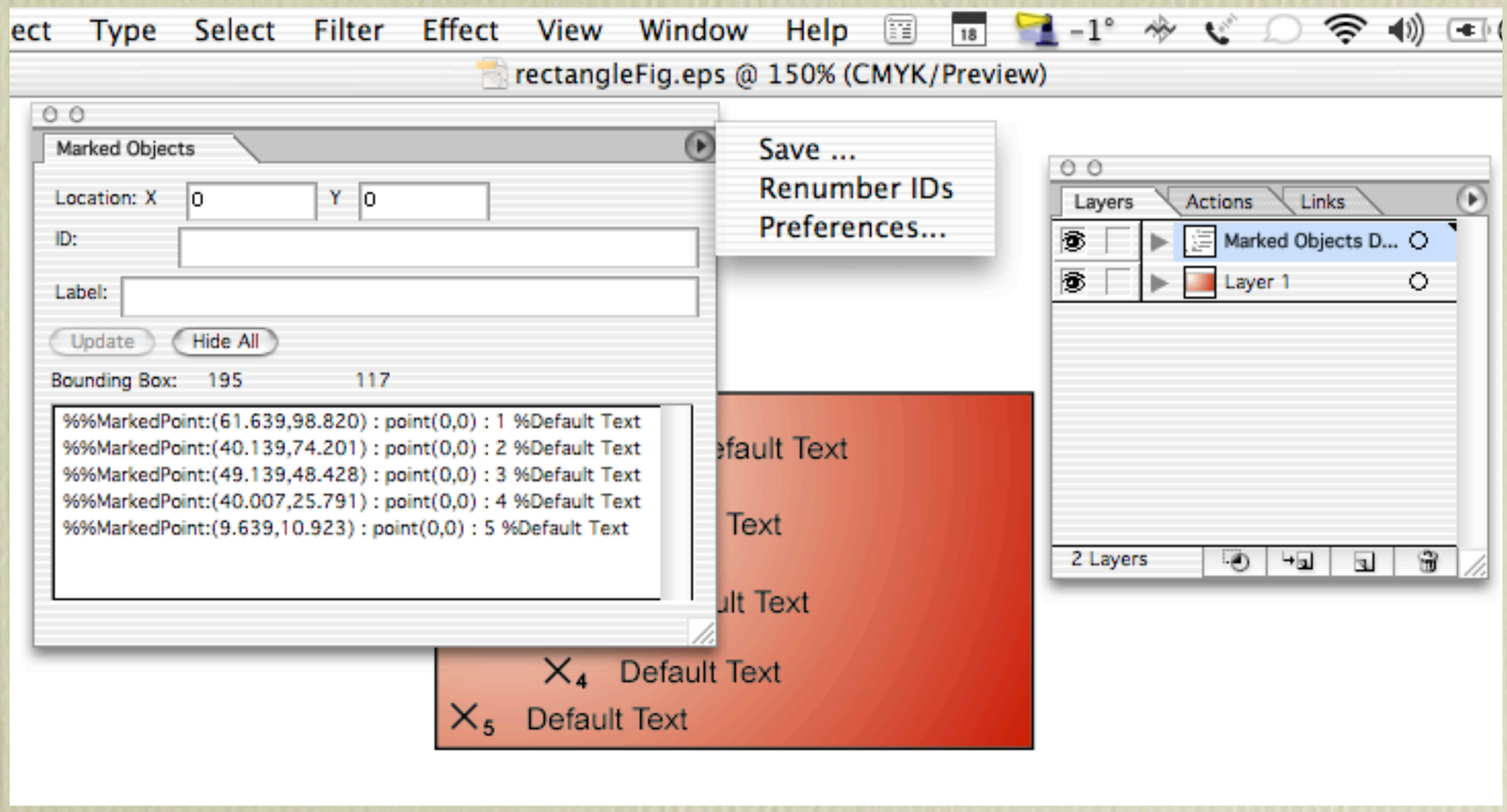
The MO Dialog



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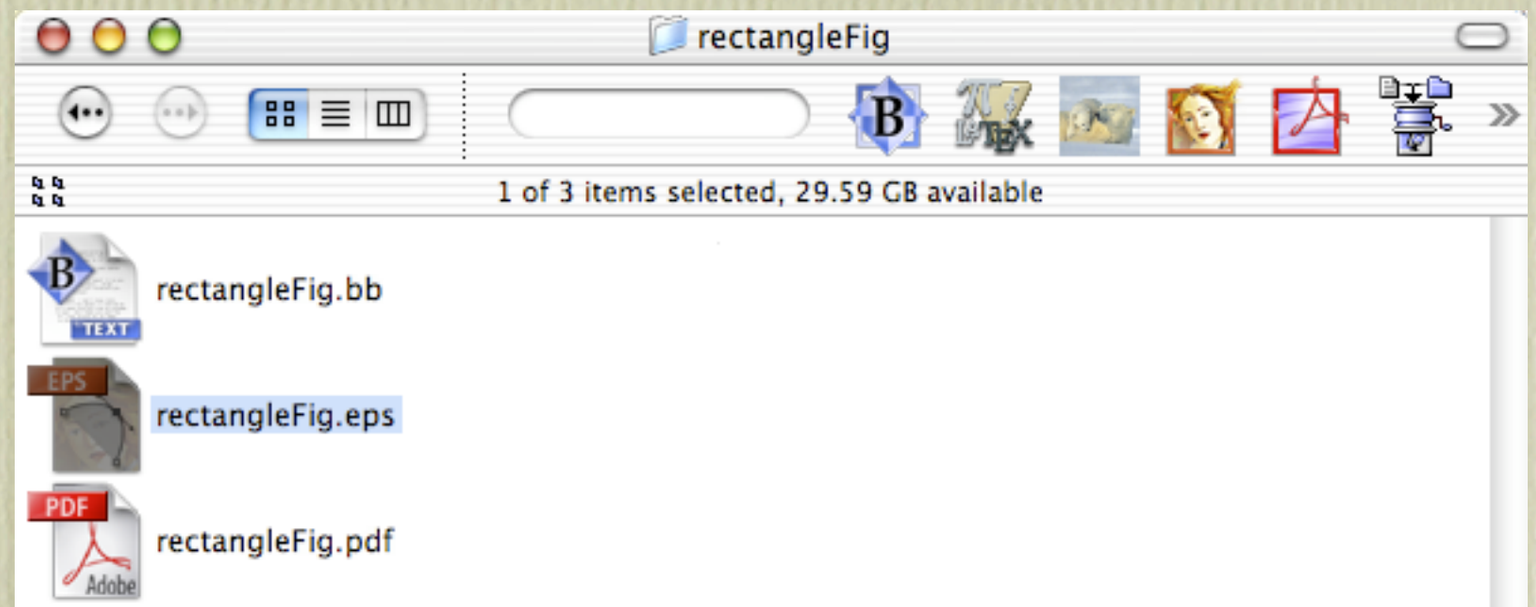
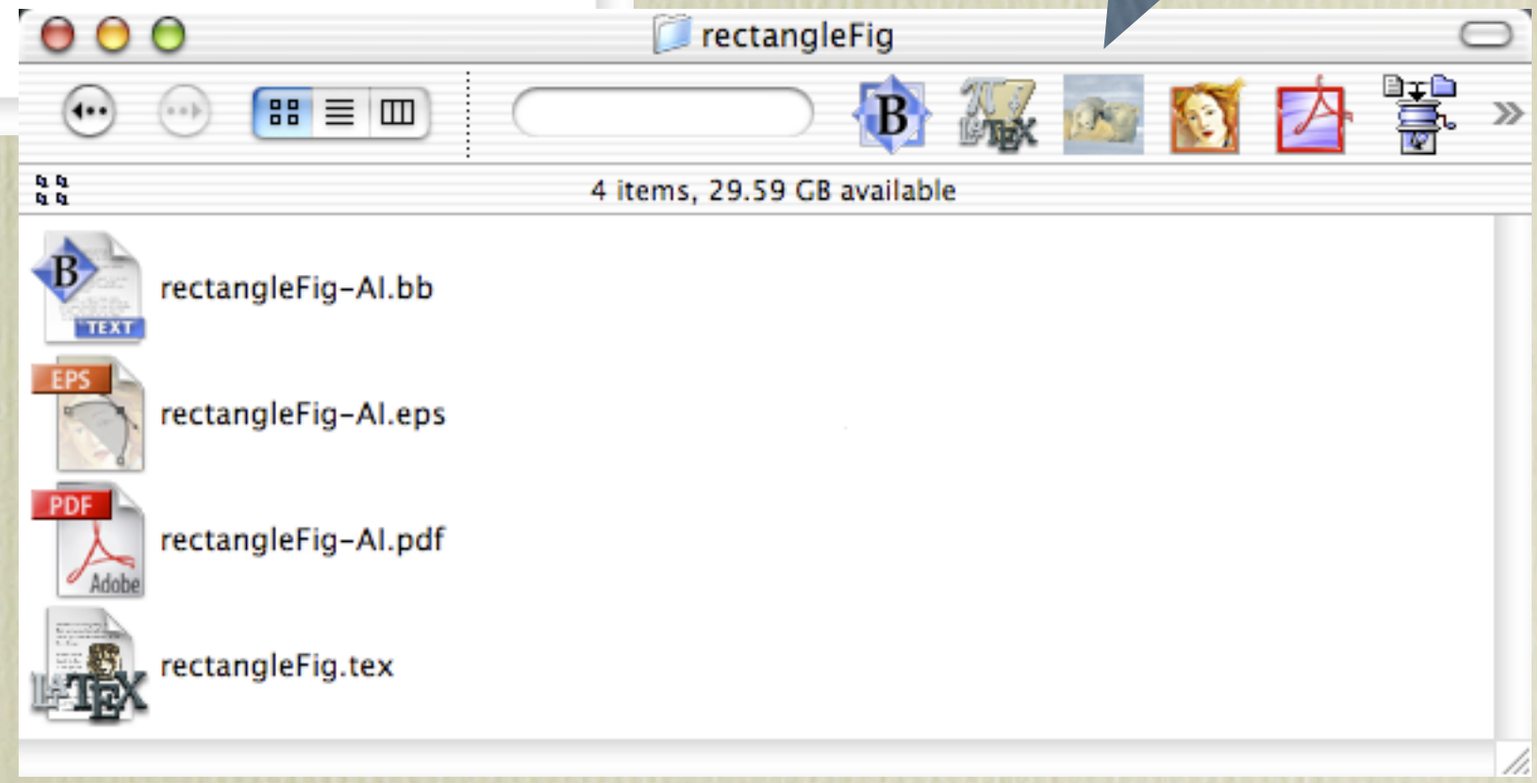
Save as EPS & PDF



Drop the `.eps` file on WarmFigToPDF (i.e., the bears).

The directory after the initial save.



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The .tex Source File

```
%&latex
\documentclass[10pt]{article}
%%%%%%%%%%%
% PACKAGES %
%%%%%%%%%%%
\usepackage{amsmath}
\usepackage{amssymb}
\usepackage{amsthm}
\usepackage{exscale}
\usepackage{mathrsfs}
\usepackage{ifthen}
\usepackage[pdftex]{graphicx}
\usepackage[dvipsnames,usenames]{color}
%%%%%%%%%%%
```

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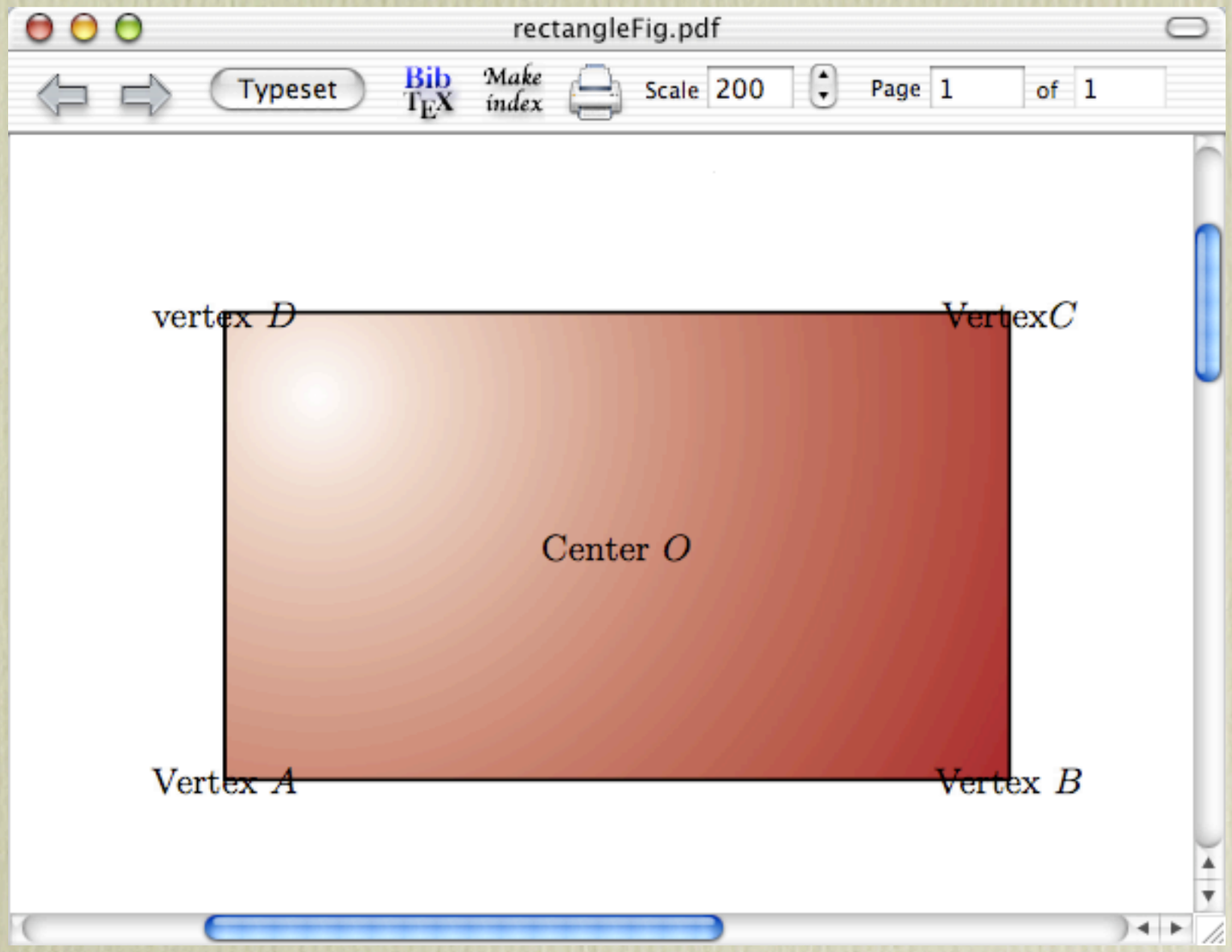
The Result of Typesetting



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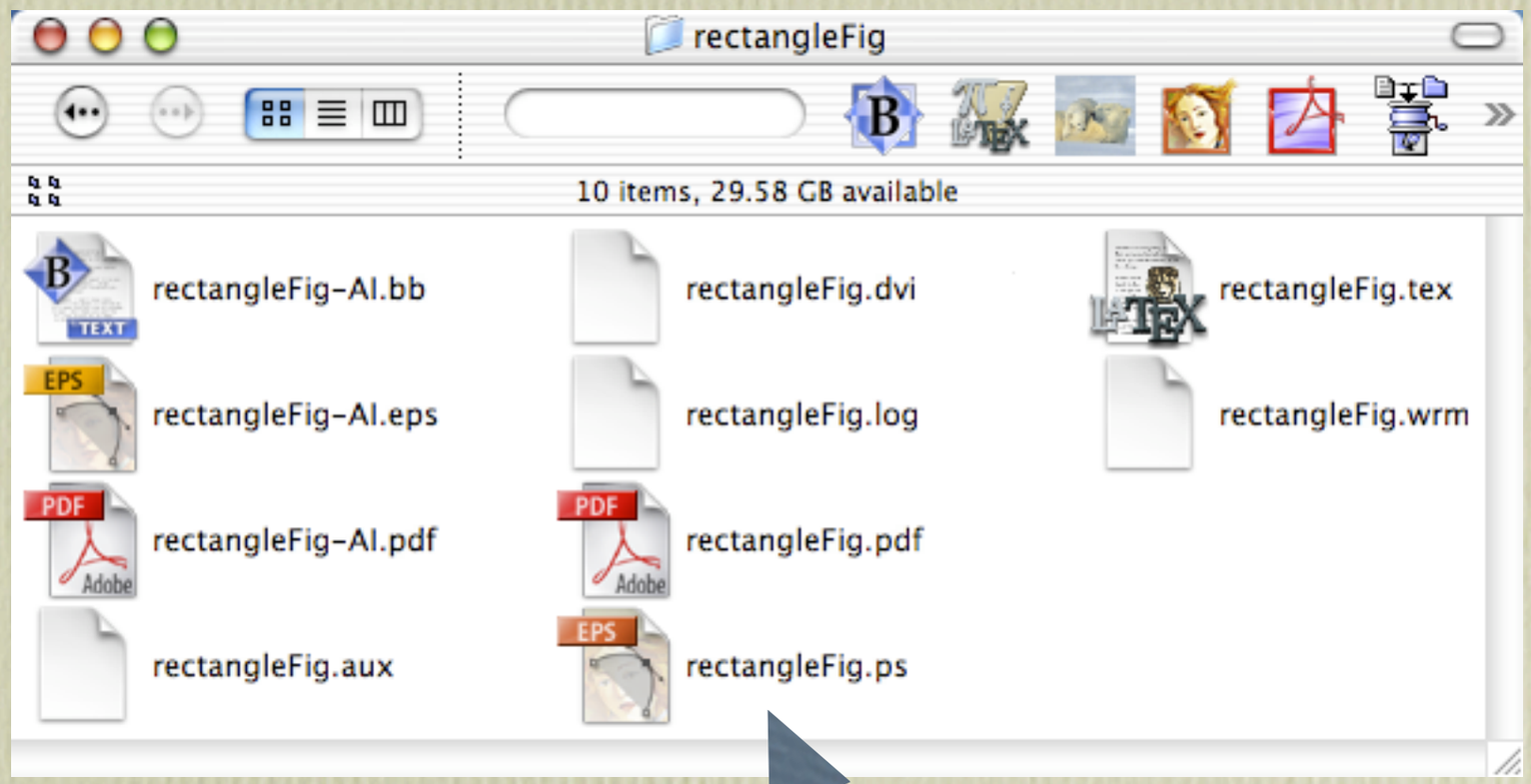
Finder: Post-Typesetting



Now drop the `.ps` file on WarmFigToPDF (i.e., the bears).

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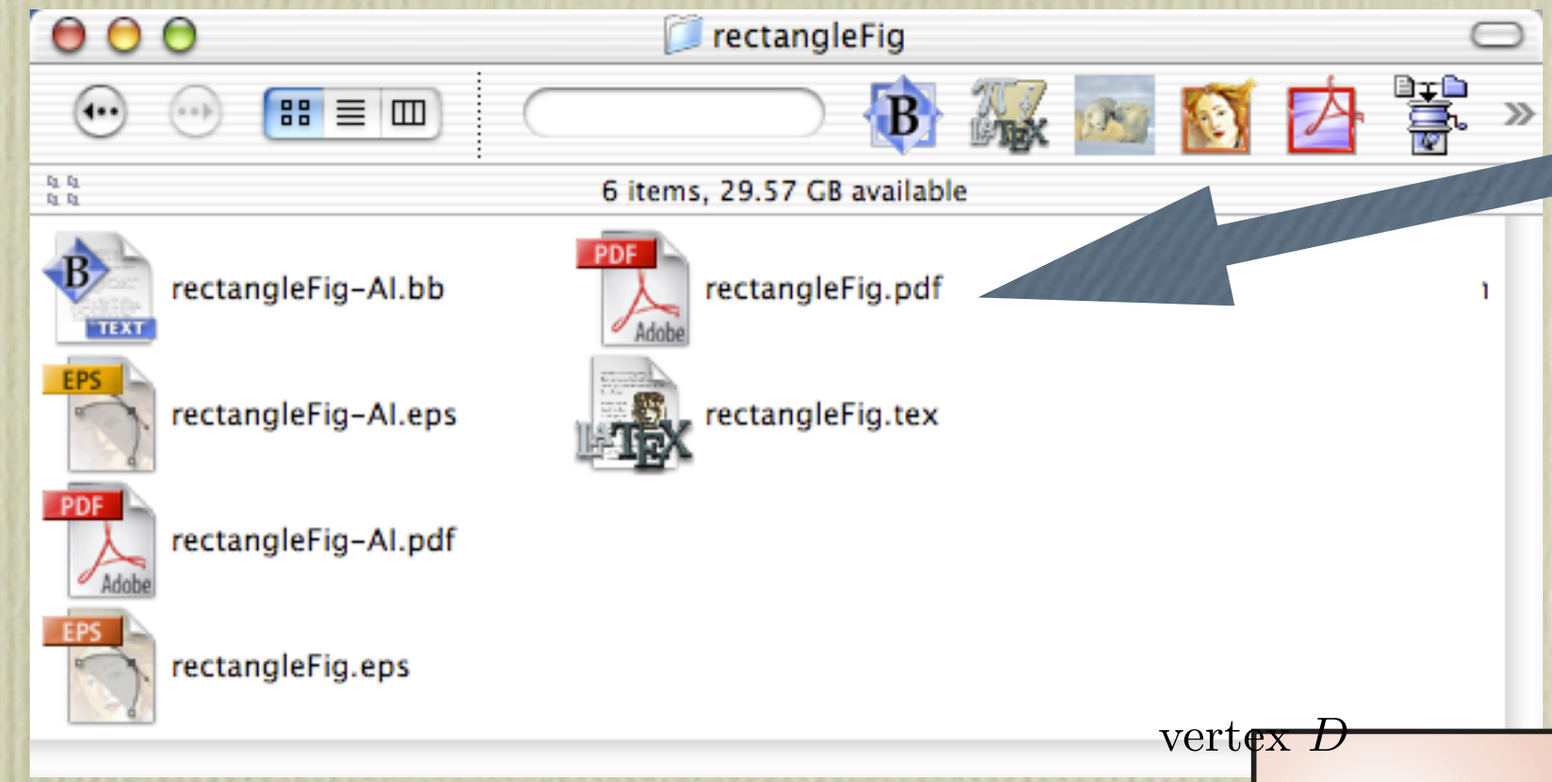
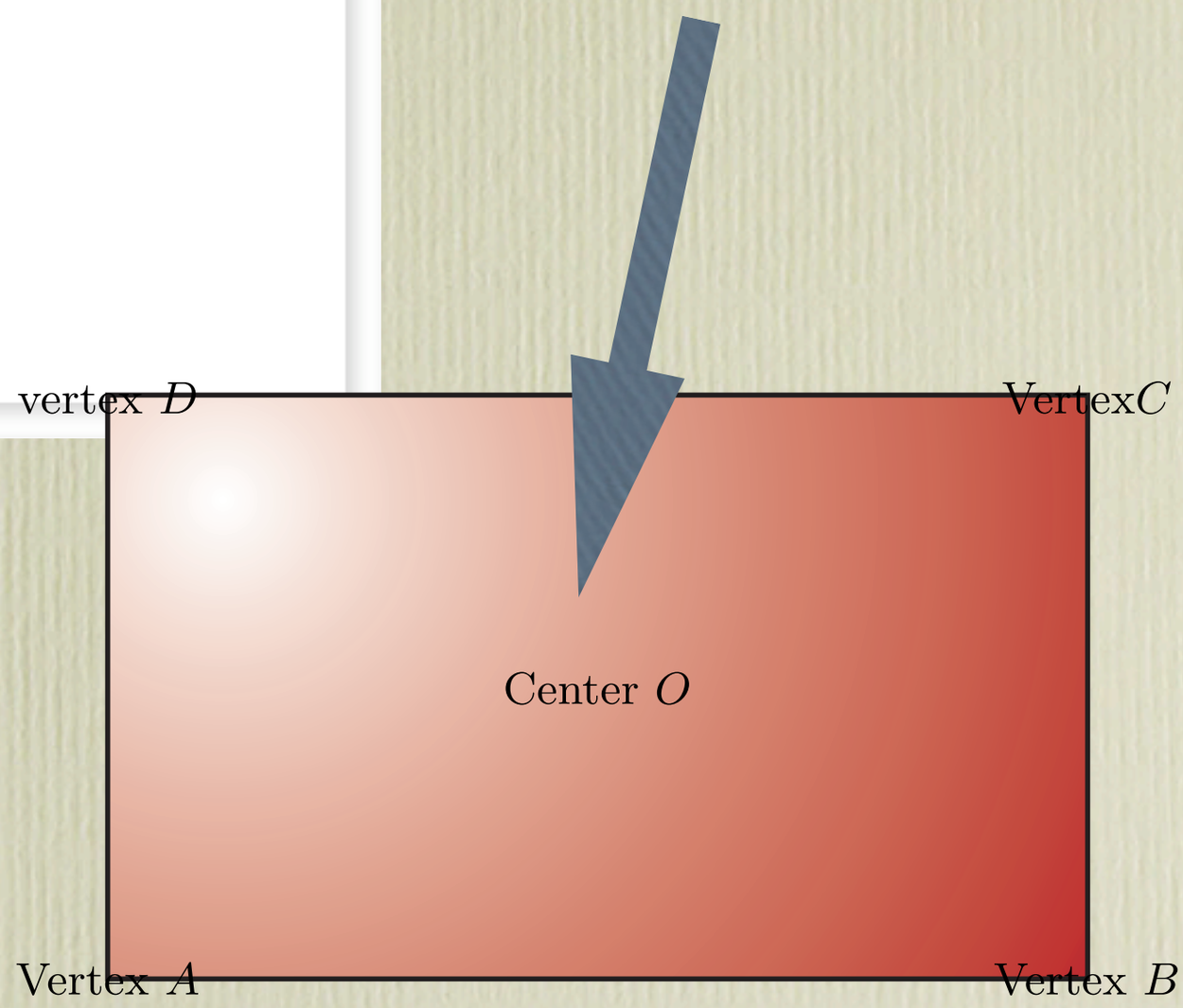
The Final Result



This is your PDF file!



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WarmFigToPDF Workshop

We don't know why everyone doesn't use this method to label figures. ☺

In fact, we are holding a WarmFigToPDF workshop at 11:30 AM on Tuesday. Please join us for the fun. ☺