CUFSM and Matlab

- The Matlab version of CUFSM allows much greater flexibility than the standalone version.
- Within the Graphical User Interface you can use mathematics, anything you could enter on the command line in Matlab you can use in the GUI examples:
  - entering 1:1:10 in the Lengths section will be interpreted as 1 2 3 4 5 6 7 8 9 10
  - to evenly space 30 points in log space between $10^0$ and $10^3$ enter `logspace(0,3,30)` in the Lengths section
  - to shift a member over 2 in. just add +2 to x the nodal coordinates of all nodes
  - etc.
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• The real power of the Matlab version is the ability to access all the features of the program from within your own programs (m-files.)

• In your m-files you can call the CUFSM routines to do your pre- and post-processing as well as perform the analysis directly and perform parametric studies, optimization, etc..
Useful CUFSM Matlab functions

• Plotting and Post-Processing
  – crossect.m: plot the cross-section, node numbers, springs, etc.
  – strespic.m: show the stress distribution
  – thecurve2.m: buckling curve plot
  – thecurve3.m: buckling curve plot, and also modal classification plot
  – dispshap.m: plot a 2D buckling mode shape
  – dispshap3d.m: plot a 3D buckling mode shape

• Model Building
  – templatecalc.m: Generate finite strip model from centerline dimensions of a C or Z
  – doubler.m: double the number of elements in a model
  – cutwp_prop2.m: calculate the properties (A, I, J, Cw, etc.) for a model
  – yieldMP: given fy calculate the yield loads and moments for a model
  – stresgen.m: given a load and/or moment calculate nodal stresses for a model
  – warp_stress.m: given a torque calculate nodal warping stress for a model

• Analysis
  – strip.m: Perform finite strip calculations for a model
Matlab Example

- An example of performing a batch code analysis in Matlab using your own files is provided.
- The example m-file is: `batchcode4cufsm312.m`
- The example runs and post-processes an example from within a matlab m-file. Extensions to parametric studies, optimization, batch post-processing require only simple modifications.