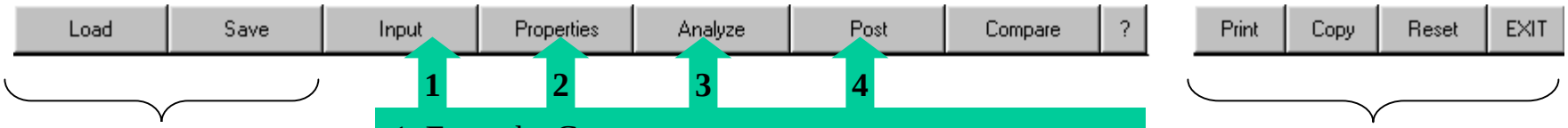
CUFSM2.5

CUFSM Overview

- Main
- Input
- Properties
- Post
- Compare



Load and Save files as desired. To compare more than one analysis, save several different files after performing analysis and load them into the Comparison post-processor (start this by pressing Compare).

1. Enter the Geometry
2. Apply the desired load/stress distribution
3. Analyze the member
4. Post-process and recover modes and critical loads

Print, sends the current screen to the default printer.

Copy sends the current screen to the clipboard in bitmap format.

Reset starts the program over and clears all entered data.

Exit, leave CUFSM

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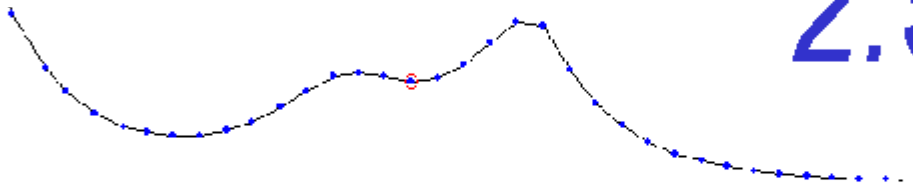

Elastic Buckling Analysis of Thin-Walled Members Using the Classical Finite Strip Method

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version 2.5

Load | Save | Input | Properties | Analyze | Post | Compare | ? | Print | Copy | Reset | EXIT

Material Properties

mat# | Ex | Ey | vx | vy | Gxy

100

Define as many materials as you like here.

C/Z template | Double Elem. | help

Nodes

node# | x | z | xdof | zdof | ydof | qdof | stress

1 5.00 1.00 1 1 1 1 33.33
2 5.00 0.00 1 1 1 1 50.00
3 2.50 0.00 1 1 1 1 50.00
4 0.00 0.00 1 1 1 1 50.00
5 0.00 3.00 1 1 1 1 16.67
6 0.00 6.00 1 1 1 1 -16.67
7 0.00 9.00 1 1 1 1 -50.00
8 2.50 9.00 1 1 1 1 -50.00
9 5.00 9.00 1 1 1 1 -50.00
10 5.00 8.00 1 1 1 1 -33.33

Directly enter, or cut and paste in,the geometry of your member here.

Update Plot

Plot Options:

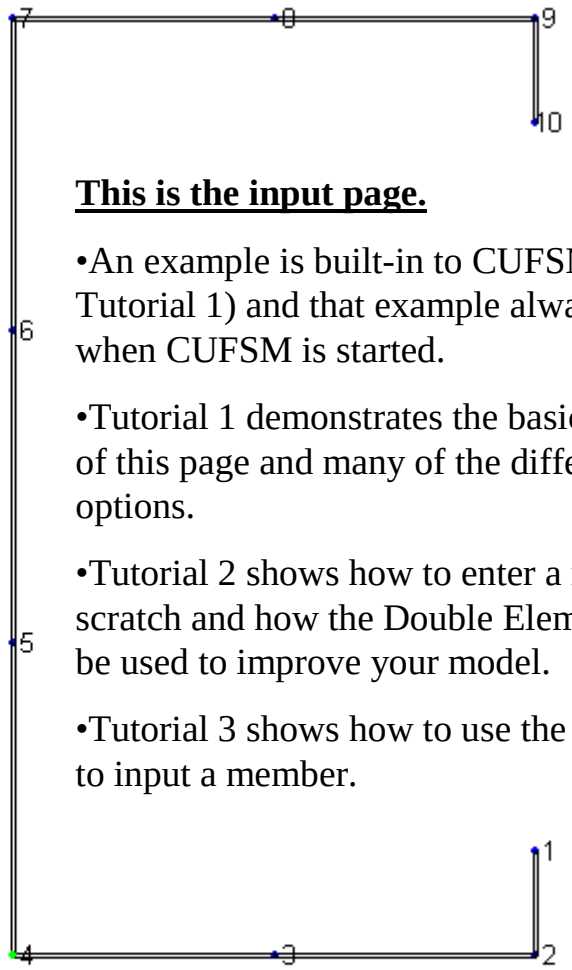
- [x] node #
- [ ] element #
- [ ] material #
- [ ] stress mag.
- [ ] stress dist.
- [ ] coordinate:
- [x] constraints
- [x] springs
- [x] origin

Elements

elem# | nodei | nodej | thickness | mat#

1 1 2 0.040000 100
2 2 3 0.040000 100
3 3 4 0.040000 100
4 4 5 0.040000 100
5 5 6 0.040000 100
6 6 7 0.040000 100
7 7 8 0.040000 100
8 8 9 0.040000 100
9 9 10 0.040000 100

Define the elements here. Each element has an individual thickness and material that you select.



This is the input page.

- An example is built-in to CUFSM (see Tutorial 1) and that example always comes up when CUFSM is started.
- Tutorial 1 demonstrates the basic functionality of this page and many of the different plotting options.
- Tutorial 2 shows how to enter a member from scratch and how the Double Elem. button may be used to improve your model.
- Tutorial 3 shows how to use the C/Z template to input a member.

Lengths

Define the half-wavelengths that your member will be analyzed at here.

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 20.0 30.0 40.0 50.0 60.0 70.0 80.0 90.0 100.0 200.0 300.0 400.0 500.0 600.0 700.0 800.0 900.0 1000.0

Springs

node# | DOF(x=1,z=2,y=3,theta=4) | kspring | kflag

0

You can model any external springs that are attached to your member here.

Constraints

node#e | DOFe | coeff. | node#k | DOFk

0

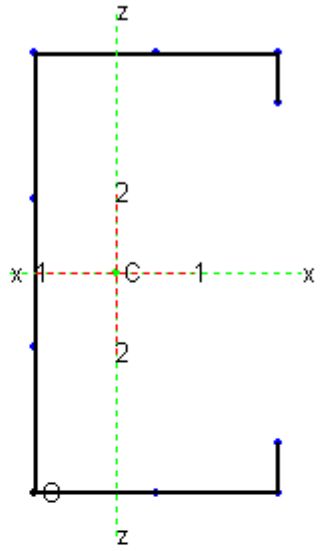
You can model any equation constraints for your mode here.

Load | Save | Input | **Properties** | Analyze | Post | Compare | ? | Print | Copy | Reset | EXIT

Calculated Section Properties

A = 0.84	
xcg = 1.6667	zcg = 4.5
Ixx = 11.8167	Izz = 3.0001
Ixz = 0	theta = 0
I11 = 11.8167	I22 = 3.0001

Simple member properties are calculated and given above. These are used below to determine stress distributions on the member.



Calculation of Loads and Moments for Generation of Stress on Member

Moment calculations should consider

(•) Unsymmetric or ( ) Restrained Bending

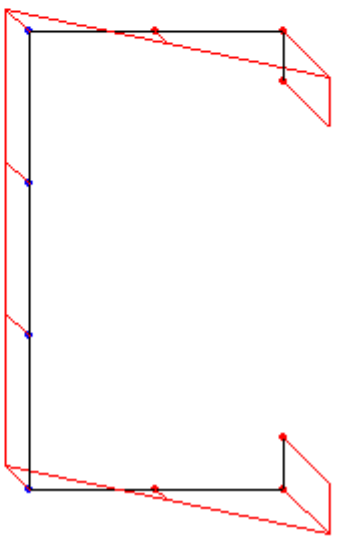
fy = 33 | Calculate P and M | ?

Loads and Moments

P =	27.72	☐
Mxx =	86.6559	☐
Mzz =	-29.7006	☑
M11 =	86.6559	☐
M22 =	29.7006	☐

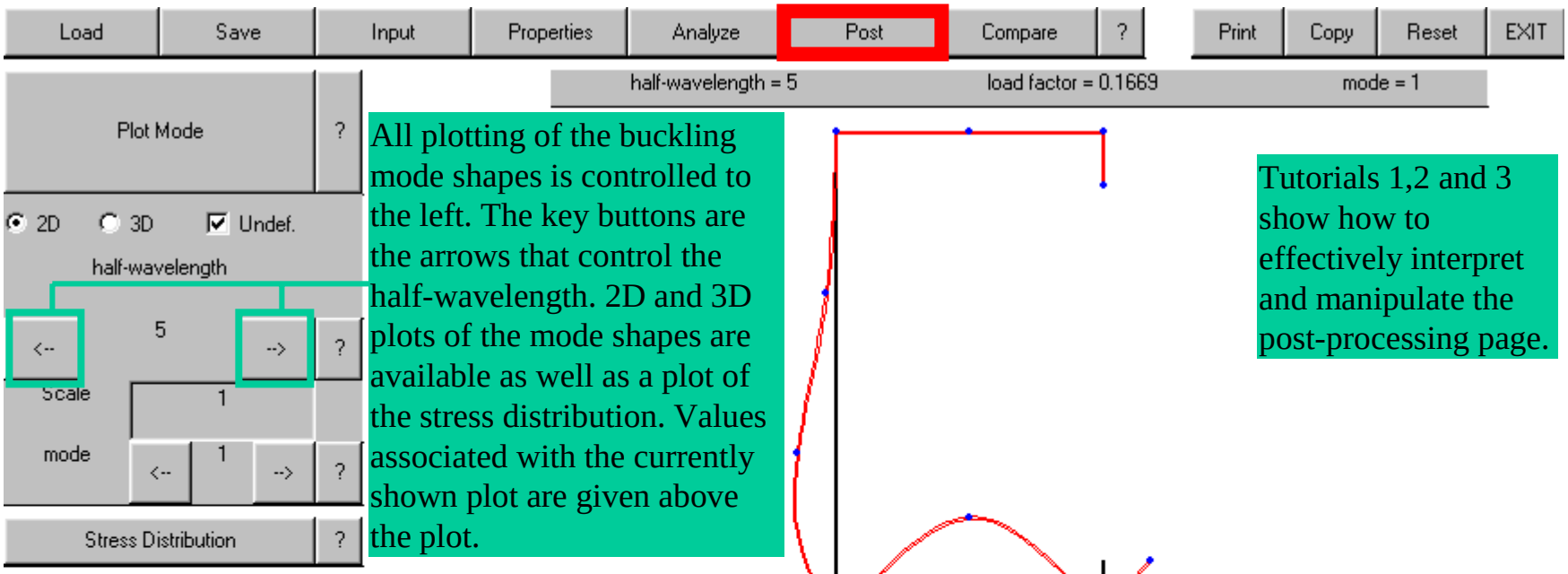
Generate Stress using checked P and M | ?

By defining a maximum, or yield stress, loads (P) and moments (M) may be determined. Any of these P or M can be used to generate a reference stress distribution on the member you create in the Input page.



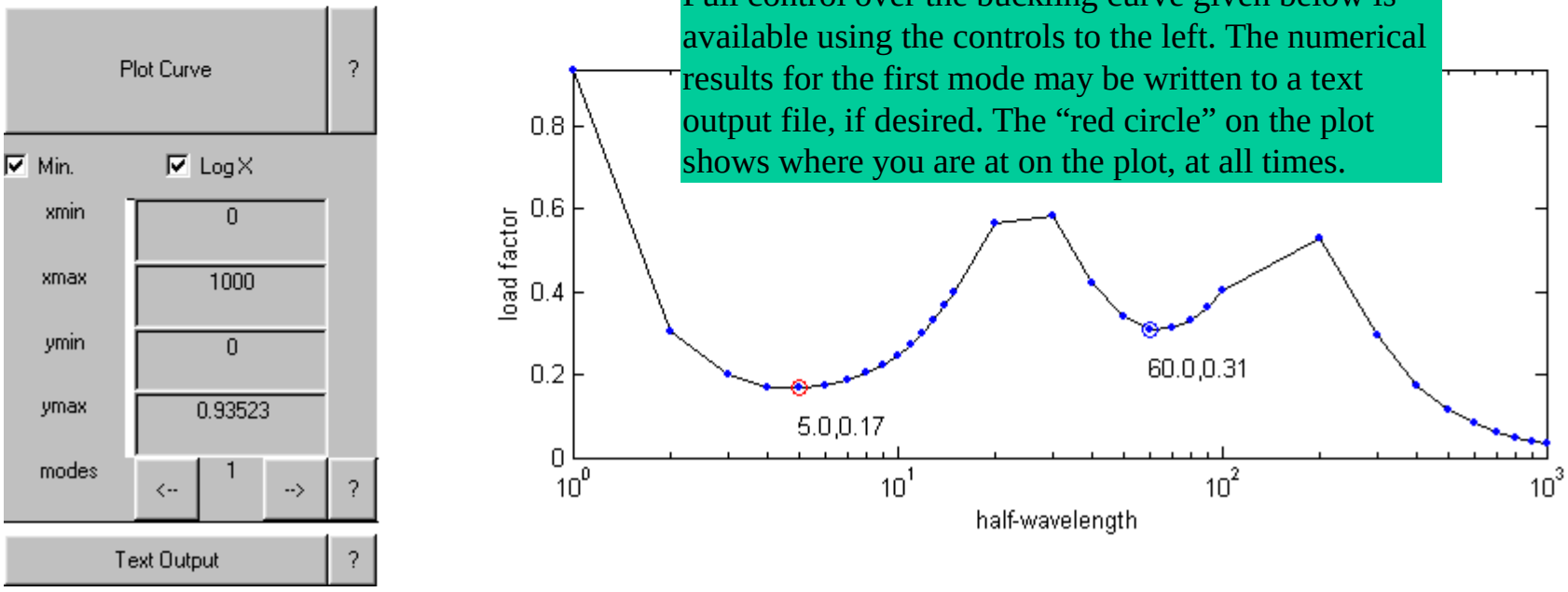
Tutorials 2 and 3 show how to use this section effectively for simple Cee and Zee members.

Scale = 1 | Max Comp. = 33 | Min Tens. = -16.5



All plotting of the buckling mode shapes is controlled to the left. The key buttons are the arrows that control the half-wavelength. 2D and 3D plots of the mode shapes are available as well as a plot of the stress distribution. Values associated with the currently shown plot are given above the plot.

Tutorials 1,2 and 3 show how to effectively interpret and manipulate the post-processing page.



Full control over the buckling curve given below is available using the controls to the left. The numerical results for the first mode may be written to a text output file, if desired. The “red circle” on the plot shows where you are at on the plot, at all times.

Load | Save | Input | Properties | Analyze | Post | Compare | ? | Print | Copy | Rese

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Plot Mode ?

2D 3D Undef.

half-wavelength

<-- 10 --> ?

Scale 1 S

mode <-- 1 --> ?

file <-- 2 --> ?

loaded files:

1 = defaultC.mat
2 = defaultc2.mat
3 = defaultc3.mat

Multiple files are loaded for post-processing at the same time, see list to the left.

Plot Curve ?

Min. Log X

xmin 2

xmax 1000

ymin 0

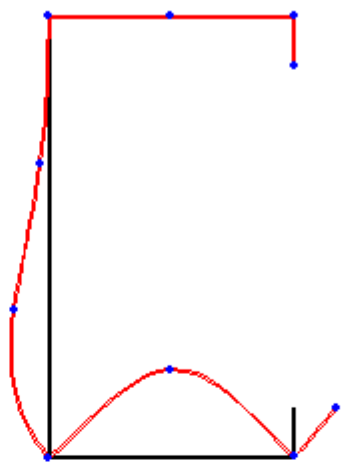
ymax 0.8

modes <-- 1 --> ?

plot files = 1 2 ?

You decide which loaded files should show in the buckling curves to the right.

The user has complete control over which buckling mode to view - select the type of plot, the half-wavelength, the mode, and which file you want to view!



half-wavelength = 10 load factor = 0.1669 mode = 1

filenumber = 2 filename = defaultc2.mat