

TRANSIENT RESPONSE ANALYSIS OF BEAM WITH SINUSOIDAL LOAD

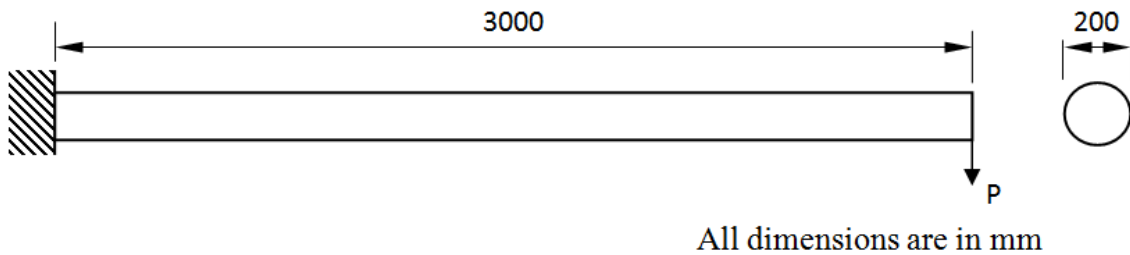


Figure 1

Material property: $E = 200 \text{ GPa}$, $\nu = 0.3$; Load $P = \sin(12.56t)$, (the load is having a frequency of 2Hz .)

PROCEDURE

1. Create key points

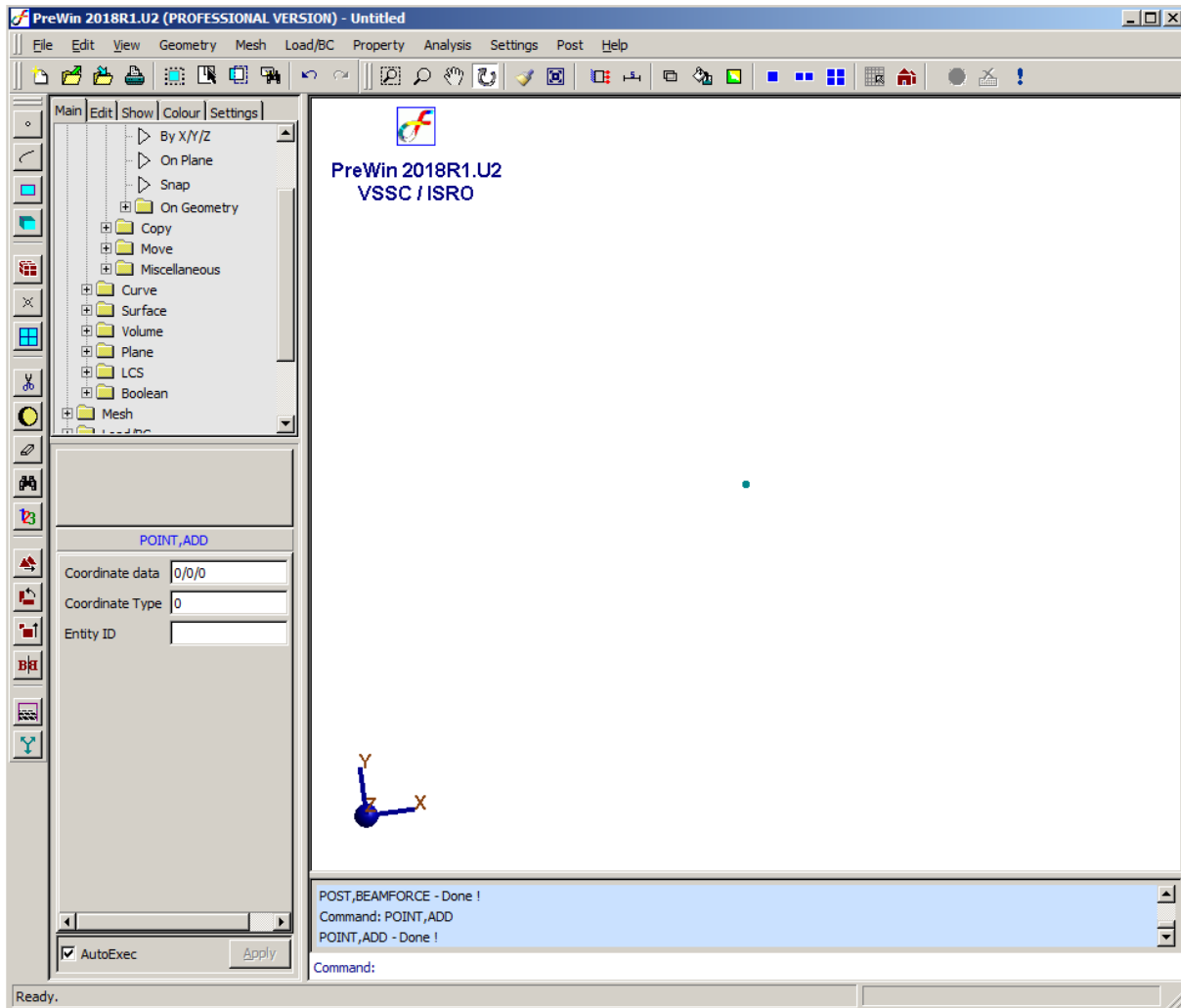
Command : POINT,ADD

Menu : Geometry → Keypoint → Create → By X/Y/Z

Parameters :

POINT,ADD	
Coordinate data	0/0/0
Coordinate Type	0
Entity ID	

At the end of the operation/s your screen should look like this.



Similarly create key point at (3000/0/0)

2. Create curve

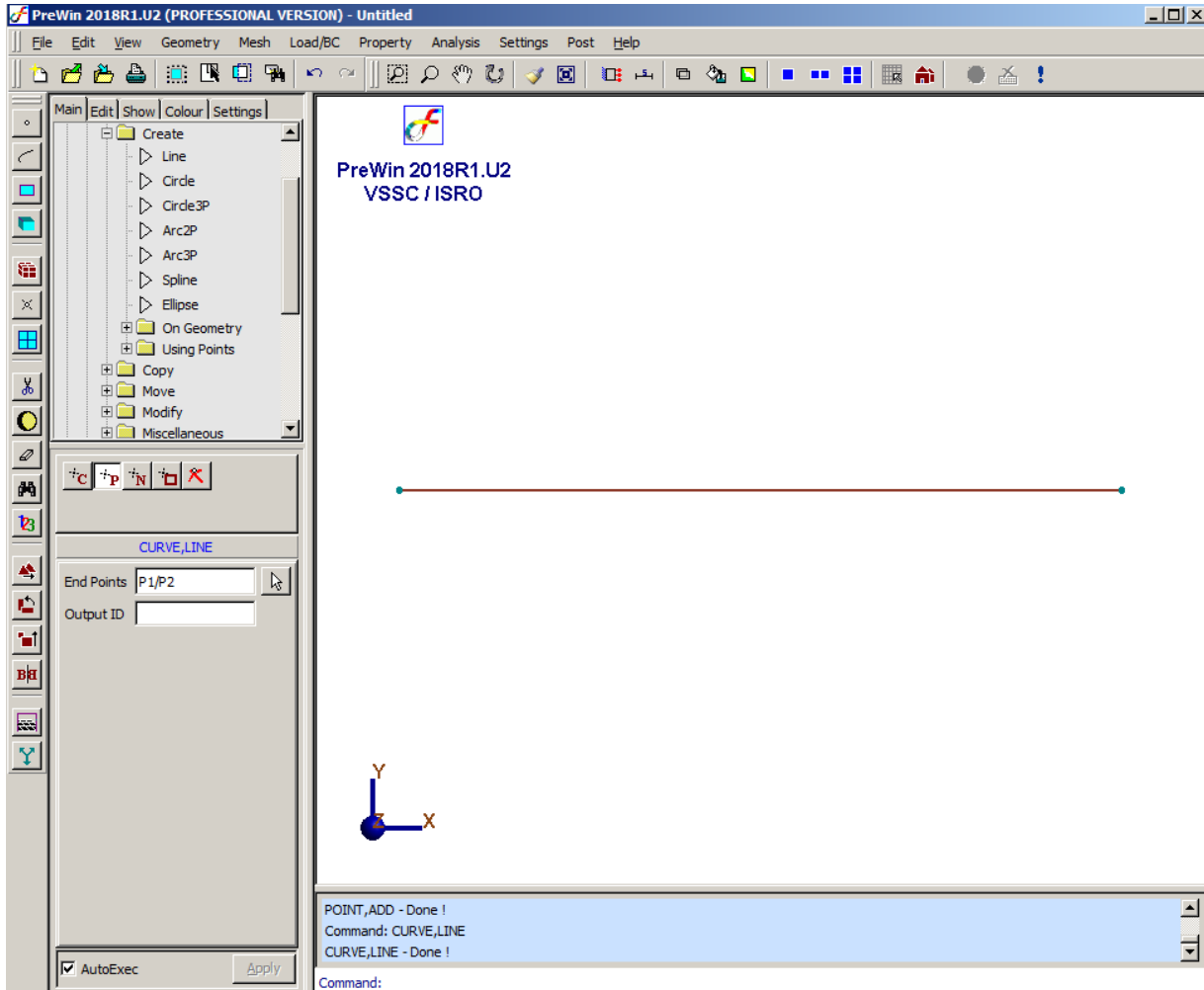
Command : CURVE,LINE

Menu : Geometry → Curve → Create → Line

Parameters :

CURVE,LINE	
End Points	P1/P2
Output ID	

At the end of the operation/s your screen should look like this.



3. Generate mesh

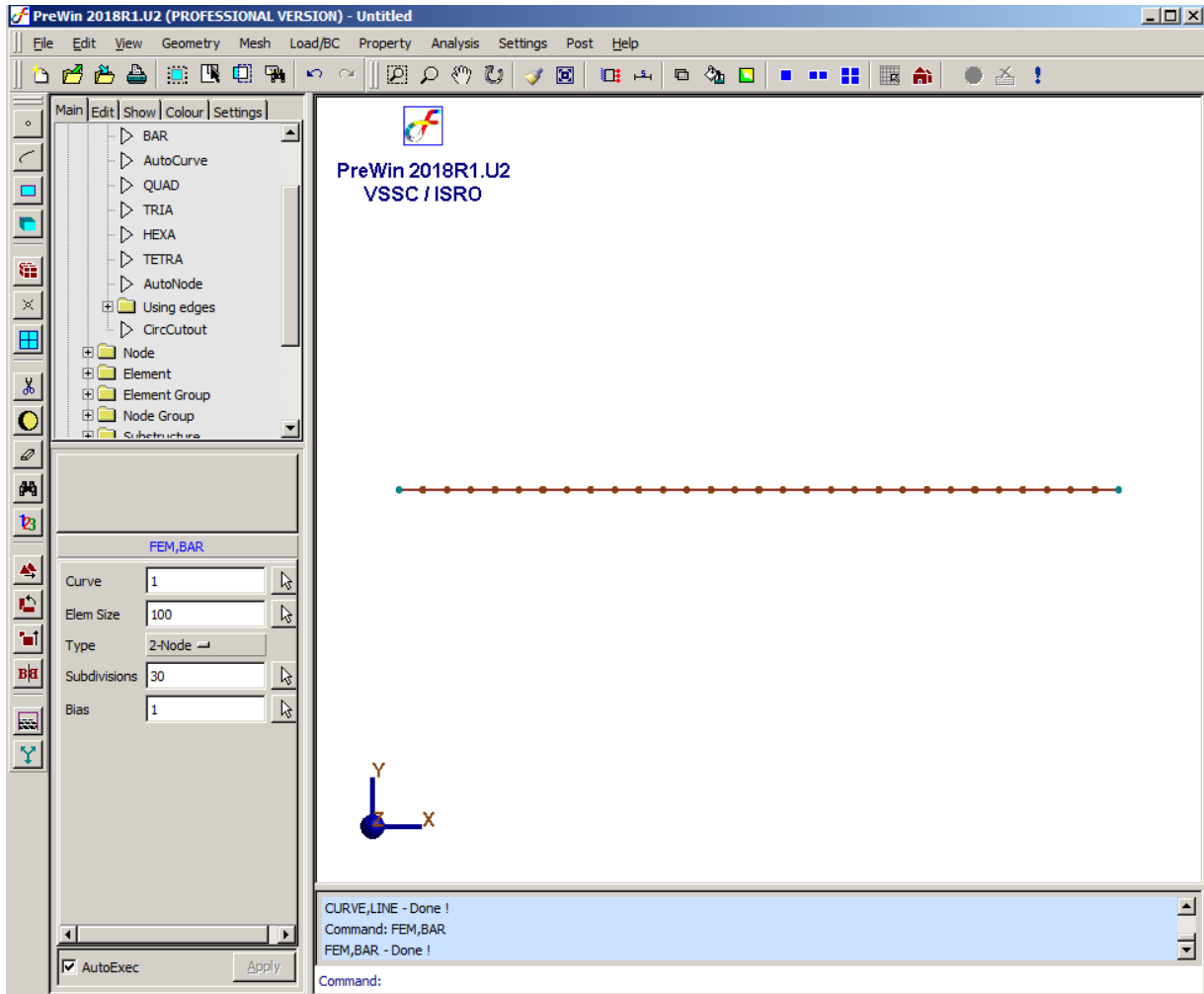
Command : FEM,BAR

Menu : Mesh → FE Mesh → BAR

Parameters :

FEM,BAR	
Curve	1
Elem Size	100
Type	2-Node
Subdivisions	30
Bias	1

At the end of the operation/s your screen should look like this.



4. Erase curve

Command : CURVE,ERASE

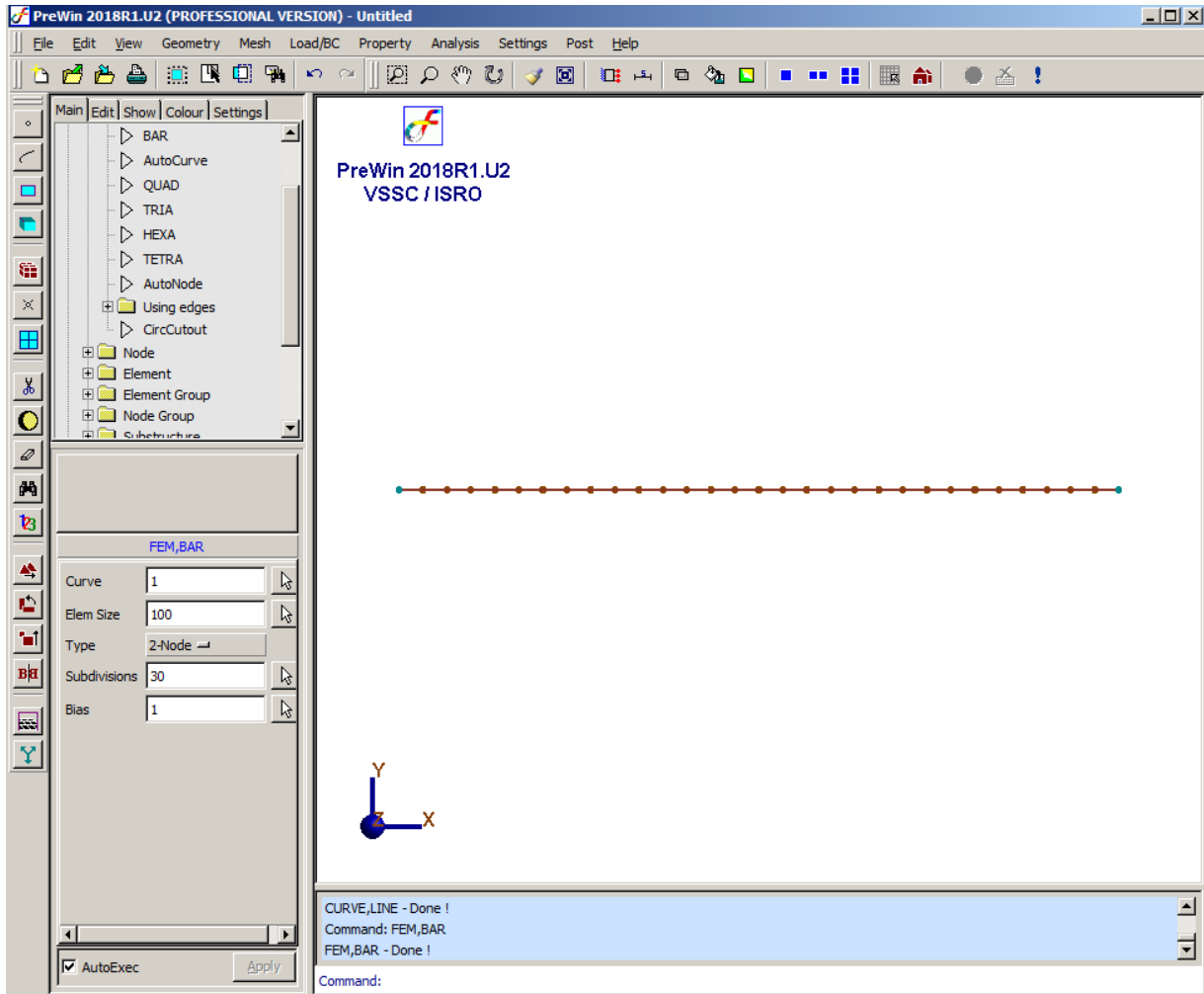
Menu : Geometry → Curve → Miscellaneous → Erase

Parameters :

CURVE,ERASE	
Curve IDs	<input type="text"/>

Type in the curve ID or pick the curve after clicking the arrow in the surface ID box

At the end of the operation/s your screen should look like this.

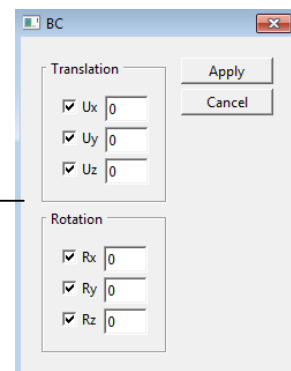
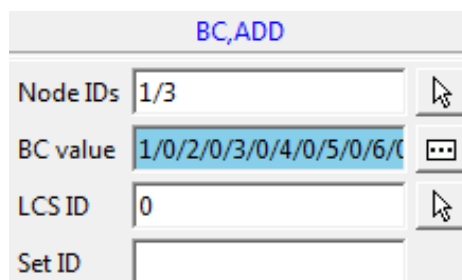


5. Apply boundary condition

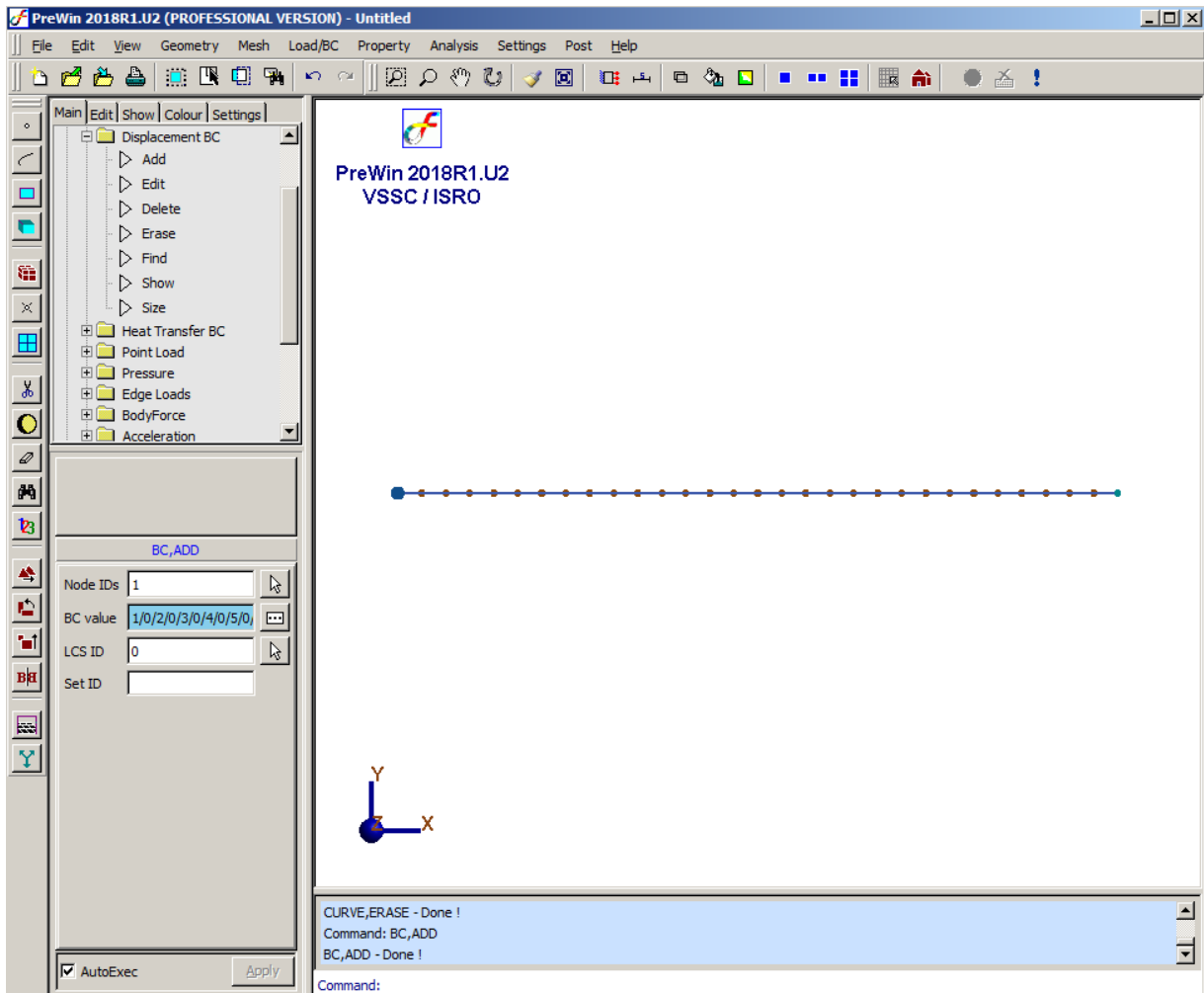
Command : BC,ADD

Menu : Load/BC → Displacement BC → Add

Parameters :



At the end of the operation/s your screen should look like this.

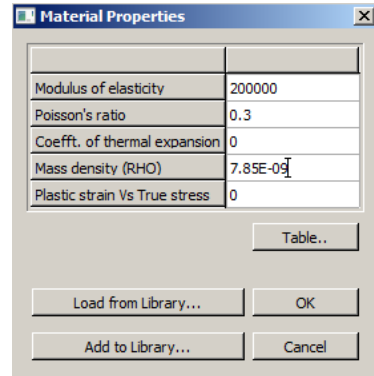
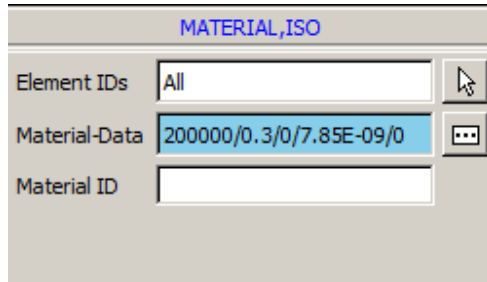


6. Specify material property

Command : MATERIAL,ISO

Menu : Property → Material → Isotropic → Add

Parameters :

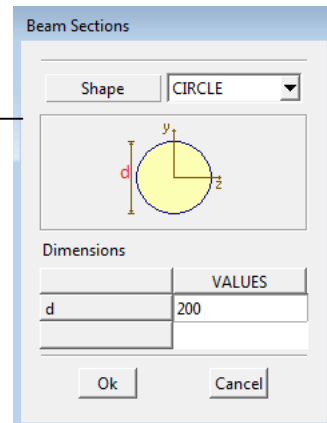
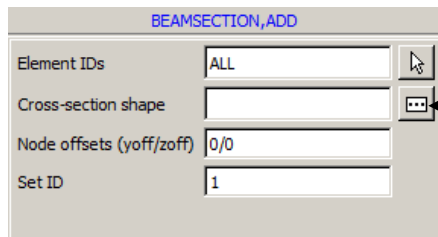


7. Specify beam section

Command : BEAMSECTION,ADD

Menu : Property → Physical → Beam Properties → Standard section → Add

Parameters :



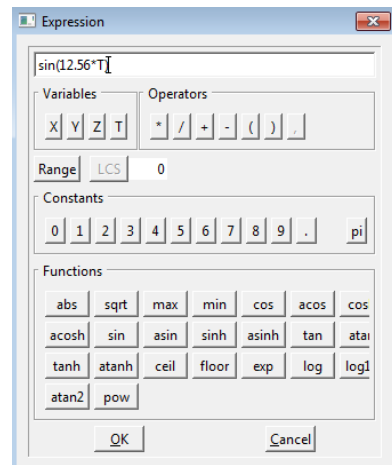
8. Specify load

i) Define sine function

In order to specify the sinusoidal load a sine function has to be defined

Command : FUNCTION,EXPRESSION

Menu : Property → Function → Expression



Parameters :

FUNCTION,EXPRESSION	
Set ID	1
Data	sin(12.56*T)

ii) Define load

Command : FORCE,ADD

Menu : Load/BC → Point Load → Add

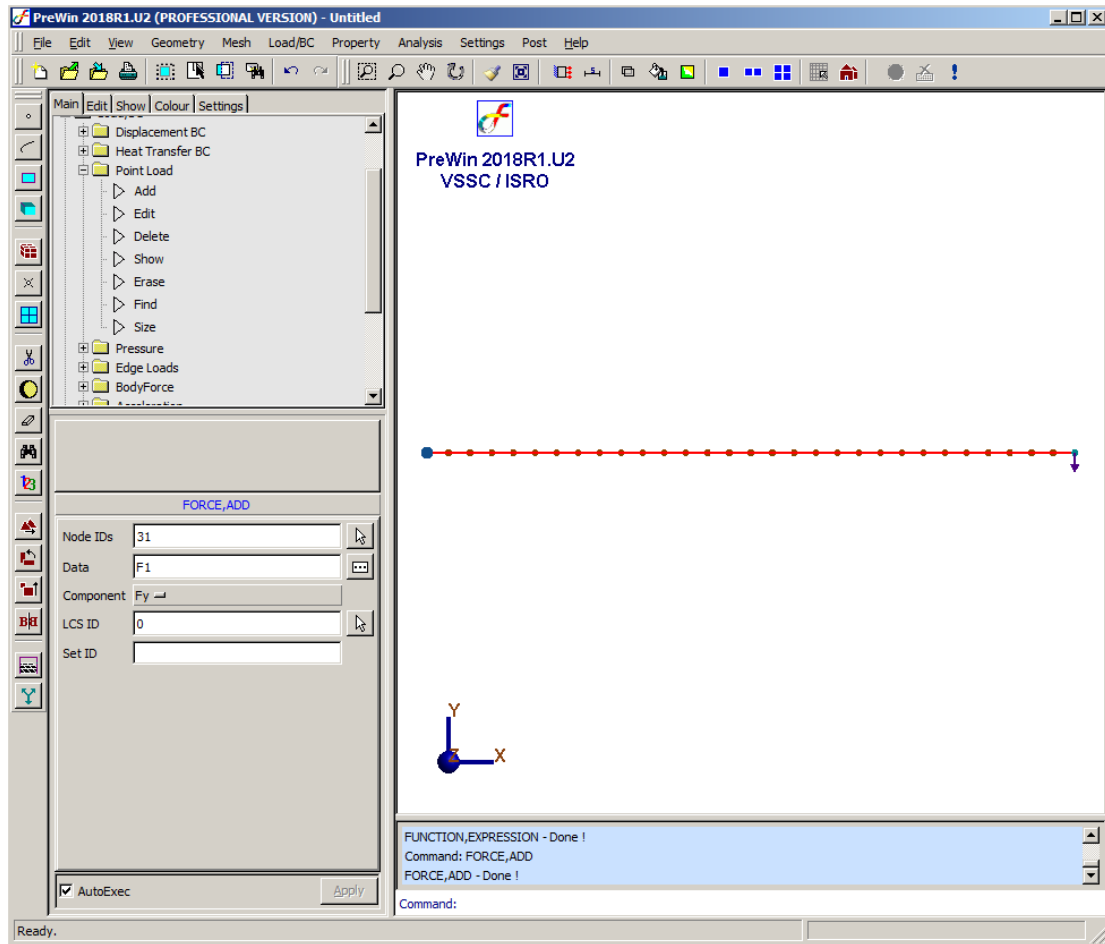
Parameters :

FORCE,ADD	
Node IDs	31
Data	F1
Component	Fy
LCS ID	0
Set ID	1

Tables
1:Expression

Accept Cancel

At the end of the above operation your screen should look like this.

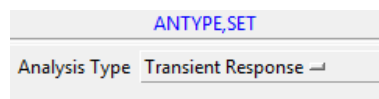


9. Set analysis type

Command : ANTYPE,SET

Menu : Analysis → Analysis Type

Parameter :

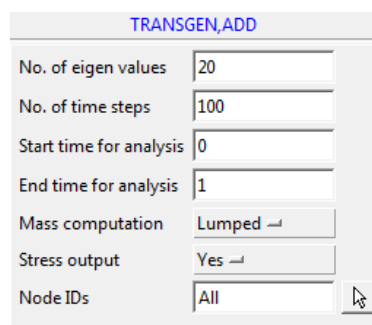


10. Specify transient response general data

Command : TRANSGEN,ADD

Menu : Analysis → Transient Response → General → Add

Parameters :

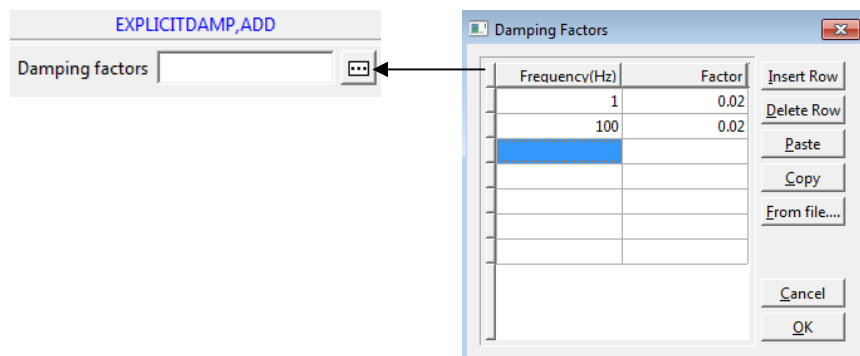


11. Specify damping

Command : TRANSGEN,ADD

Menu : Analysis → Transient Response → Damping → Add

Parameters :

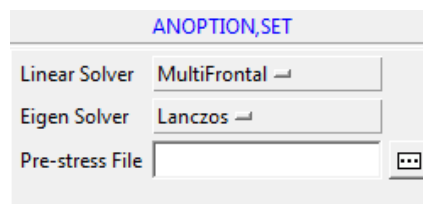


12. Set analysis option

Command : ANOPTION,SET

Menu : Analysis → Analysis Option

Parameters :



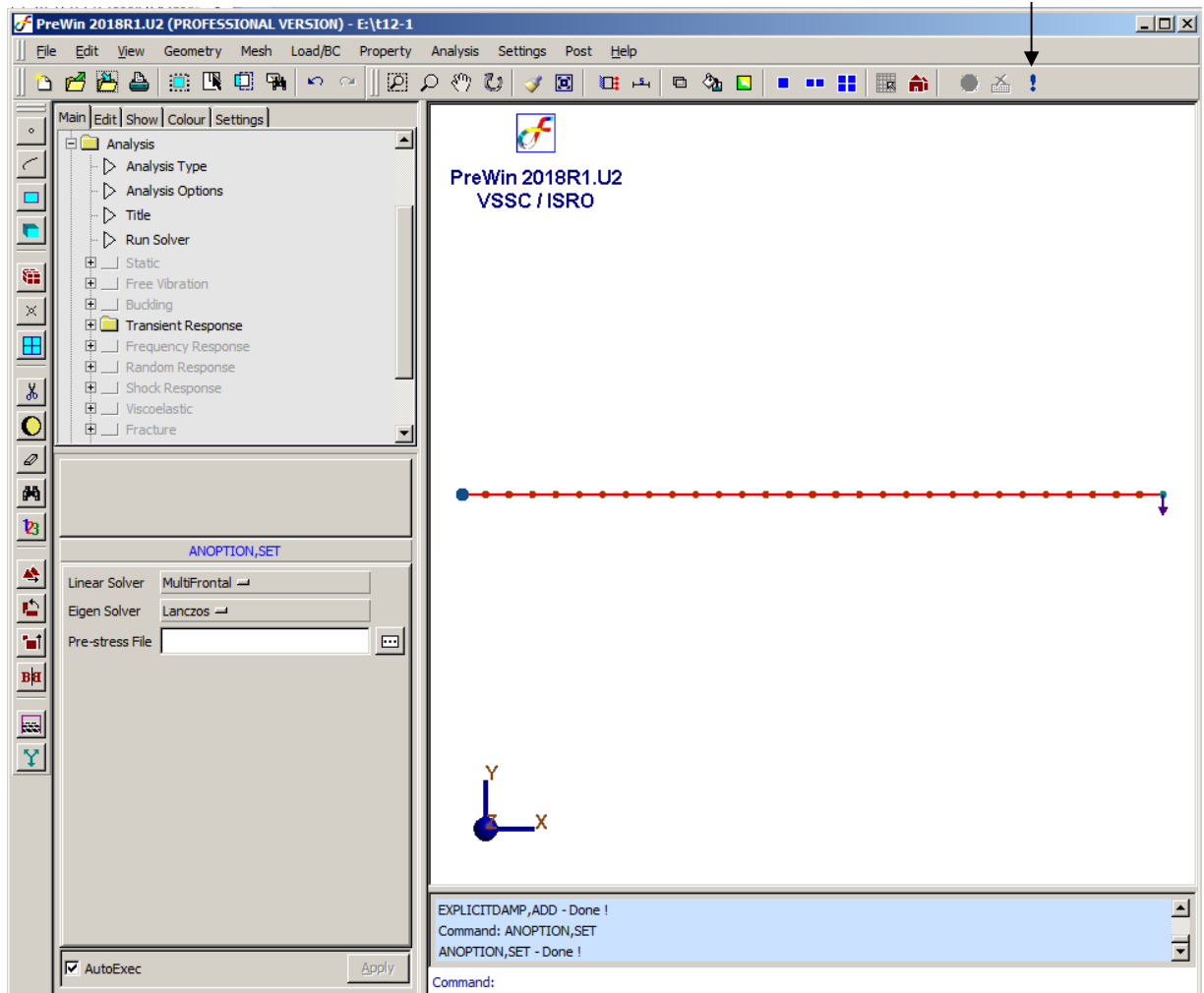
13. Save the project model

Menu : File → Save

14. Submit the job in to FEAST

Menu: Analysis → Run Solver

Click Here



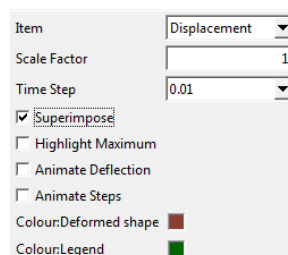
15. Perform Post Processing

i) Displacement

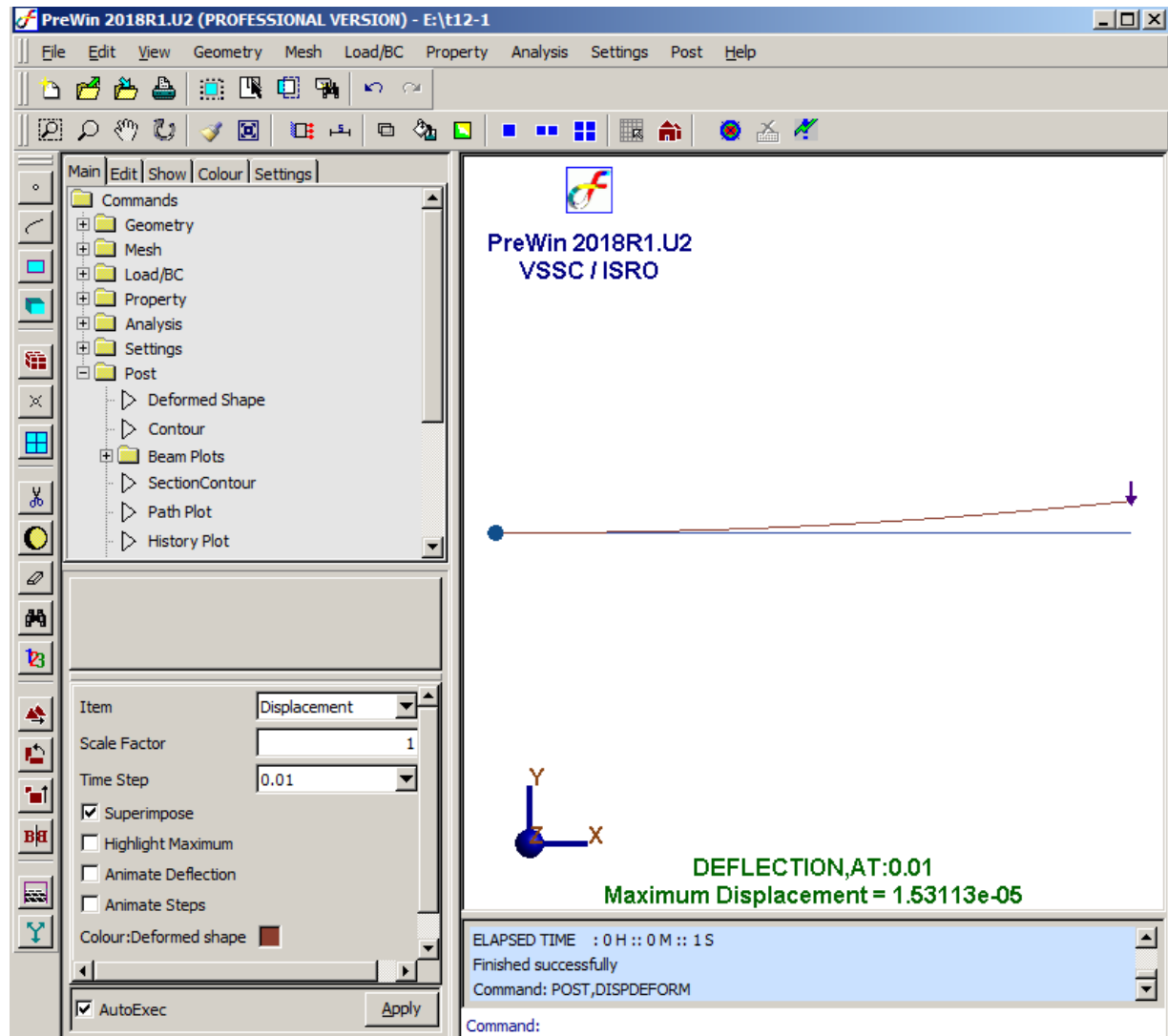
Command : POST,DISPDEFORM

Menu : Post → deformed Shape

Parameters :



At the end of the above operation your screen should look like this.



ii) Beam stress

Command : POST,BEAMCONTOUR

Menu : Post → Beam Plots → Stress Contour

Parameters :

POST,BEAMCONTOUR	
Component	AXIAL
Decimal Places	2
No. of contours	9
Element List	ALL
Time Step	0.25
<input type="checkbox"/> Highlight Maximum	
<input type="checkbox"/> Use Absolute	
Colour:Label	

At the end of the above operation your screen should look like this.

