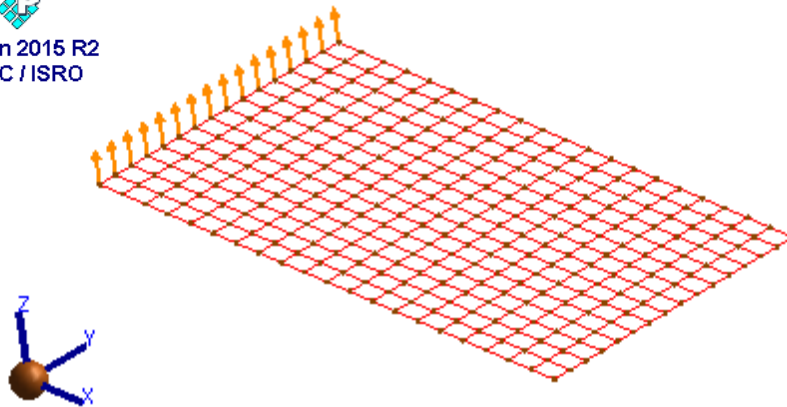


FREQUENCY RESPONSE ANALYSIS OF BASE EXCITED CANTILEVER PLATE


PreWin 2015 R2
VSSC / ISRO



Undeformed shape of base excited cantilever plate in FEAST

Plate Dimension	200x100x1mm
Seismic Mass	1000kg
Young's modulus	70000MPa
Poisson ratio	0.3
Density	7800e-12 kg/m ³
Amplitude	Unit acceleration along z direction
Boundary condition	$U_x=U_y=R_x=R_y=R_z=0$

PROCEDURE

STEP

1. Create a Rectangle Surface

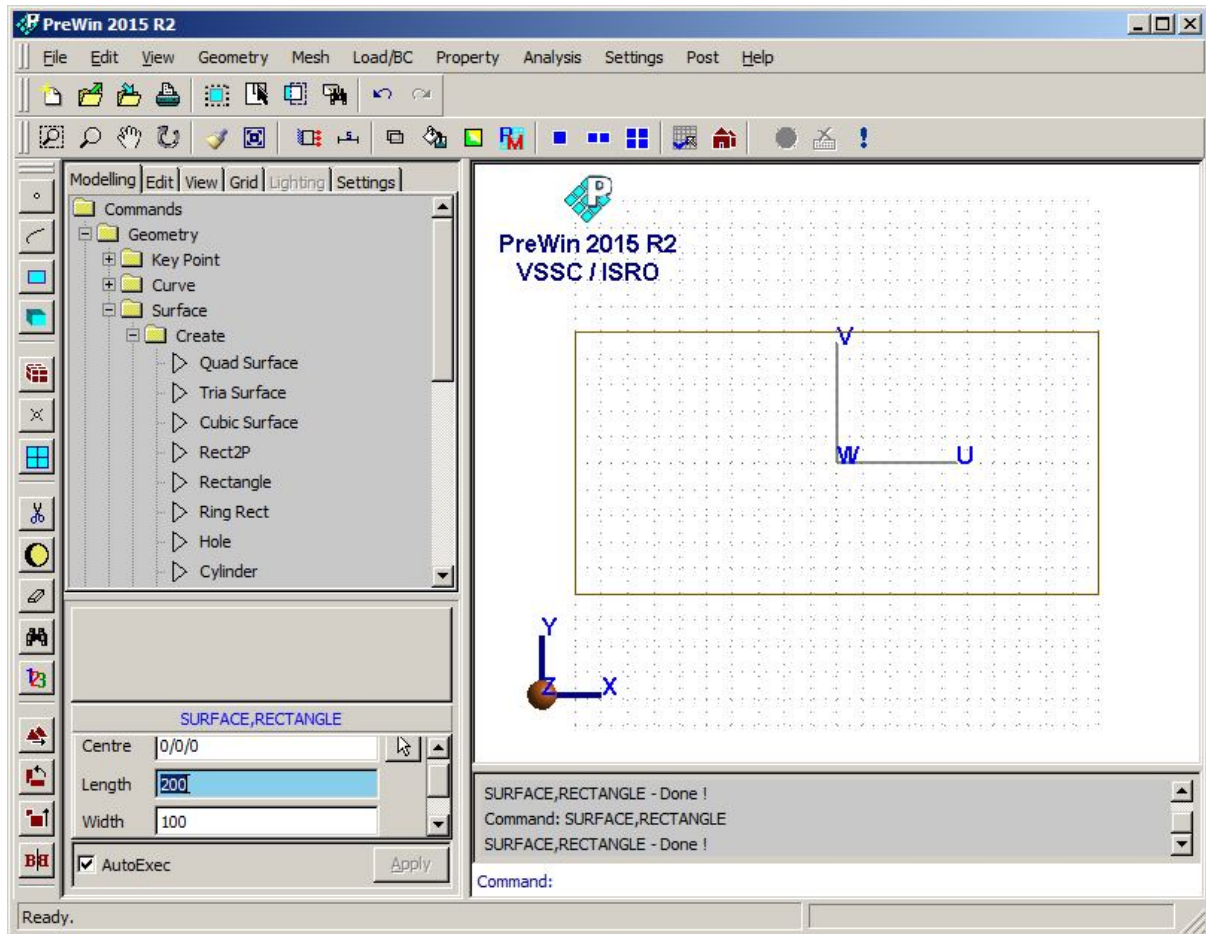
Command : SURFACE, RECTANGLE

Menu : Geometry → Surface → Create → Rectangle

Parameters :

Centre	0/0/0
Length	200
Width	100
Work plane ID	1
Entity ID	

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



2. Meshing the surface using quadrilateral elements

Command : FEM, QUAD

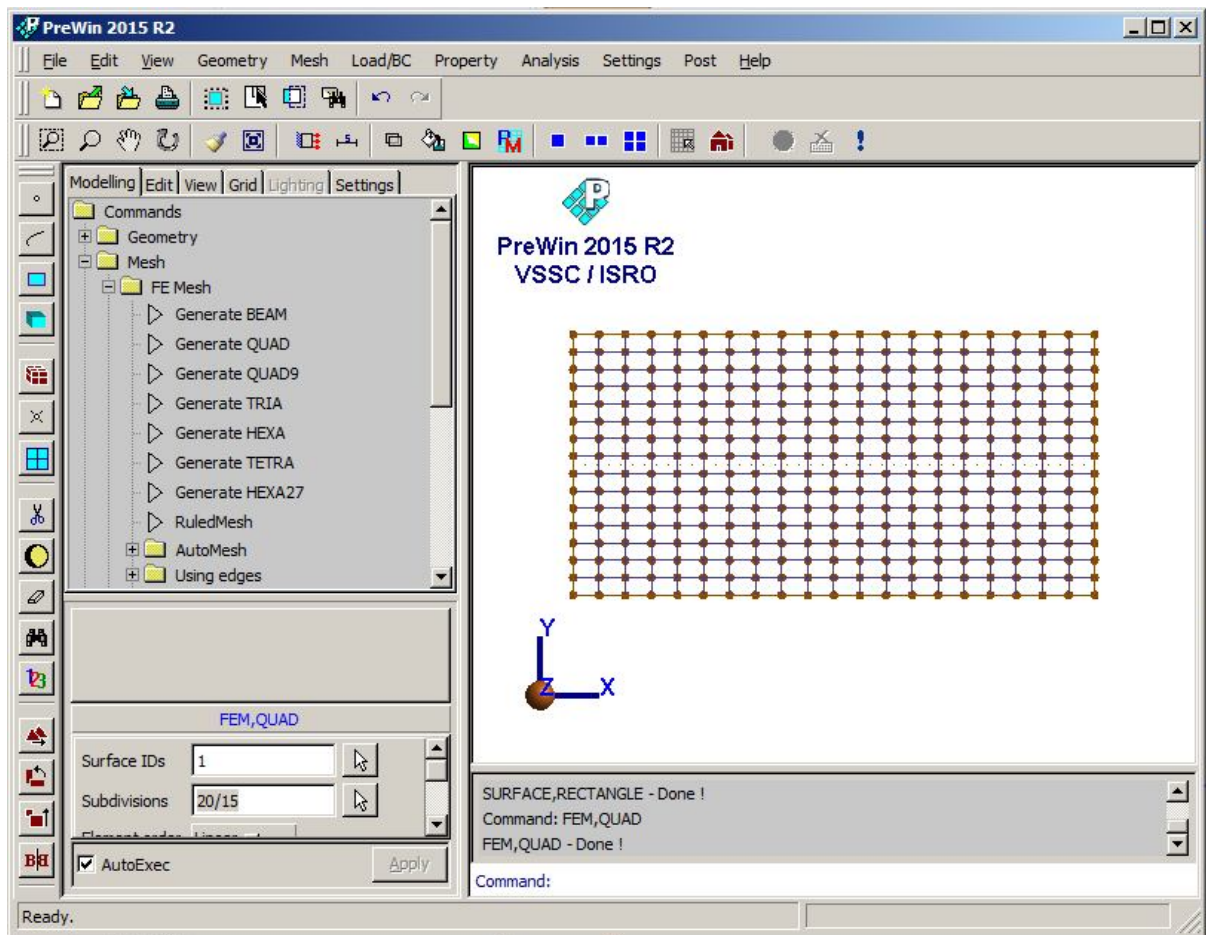
Menu : Mesh → FE Mesh → Generate Quad

Surface IDS	1
Subdivisions	20/15
Element order	Linear
Bias Factors	1/1
Material ID	1

Parameters :

Property ID	1
Element Type	
Element IDS	
Node IDS	

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



3. Delete surfaces

Command : SURFACE, DELETE

Menu : Geometry → Surface → Miscellaneous → Delete

Parameters :

Surface IDS	1
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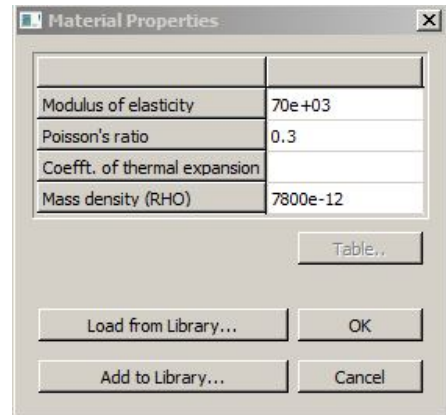
4. Specify material properties

Command : MATERIAL, ISO

Menu : Property → Material → Isotropic → Add

Parameters :

Element IDs	All
Material Data	70000/.3/0/7800E-12
Material ID	1



5. Specify shell thickness

Command : THICKNESS, ADD

Menu : Property → Physical → Thickness → Add

Parameters :

Element IDs	All
Thickness	1
Set ID	1

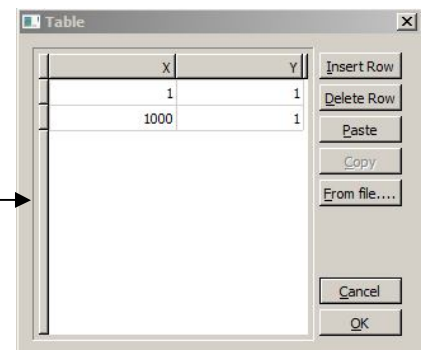
6. Specify Table data

Command : FUNCTION, REAL

Menu : Property → Function → Real Table

Parameters :

SET ID	1
Table Data	1/1/1000/1



7. Set the analysis type

Command : ANTYPE, SET

Menu : Analysis → Analysis Type

Parameters

Analysis Type	Frequency Response
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8. Set the analysis Options

Command : ANOPTION, SET

Menu : Analysis → Analysis Options

Parameters :

Linear Solver	MultiFrontal
Eigen Solver	Lanczos

9. Specify Frequency generate data

Command : FREQGEN, ADD

Menu : Analysis → Frequency Response → General → Add

Parameters

No of eigen values	15
Start frequency	1
End frequency	1000
Finer Increment	0.1
Coarser Increment	1
Mass computation	Lumped

:

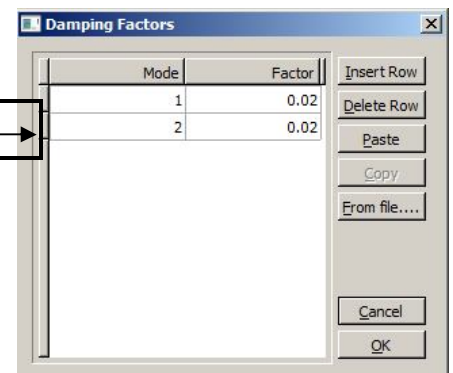
10. Specify damping factor

Command: EXPFRDAMP, ADD

Menu : Analysis → Frequency Response → Damping → Add

Parameters:

Damping factor	1/0.02/2/0.02
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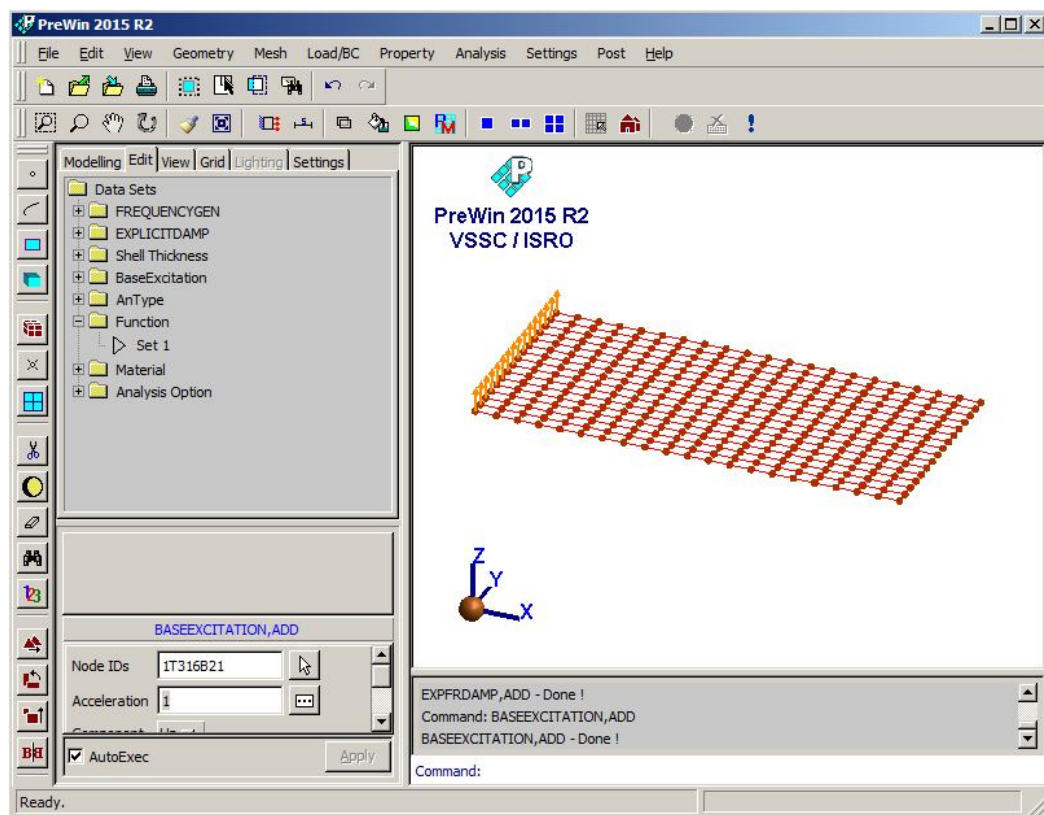
11. Specify base excitation data

Command: BASEEXCITATION, ADD

Menu : Analysis → Frequency Response → Base Excitation → Add

Node IDs	1T316B21
Acceleration	1
Component	Uz
LCS ID	0

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



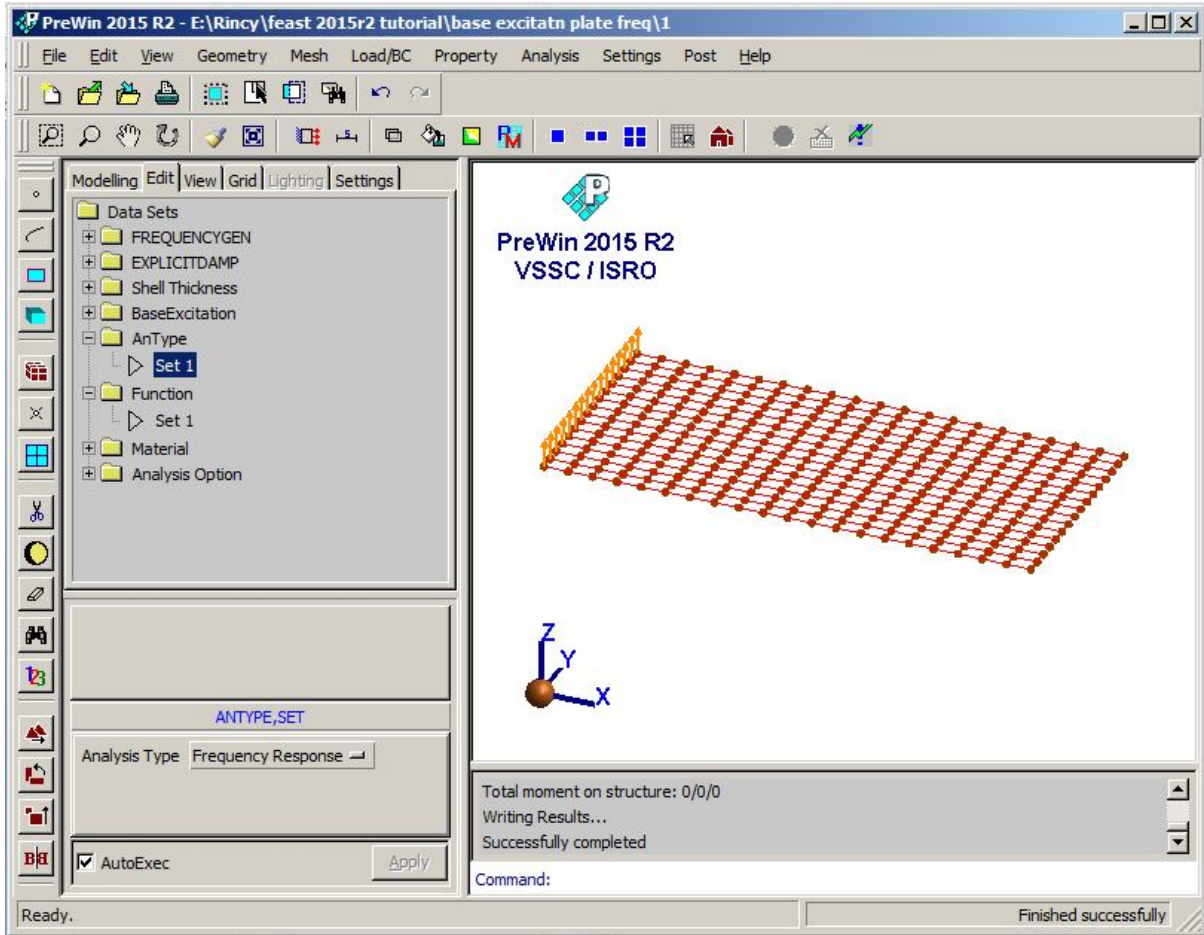
12. Save the project model

Menu : File → Save

13. Submit the job into FEAST

Menu : Analysis → Run solver

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



After the solution is completed the message “successfully completed” appears in the message box

14. Perform post processing

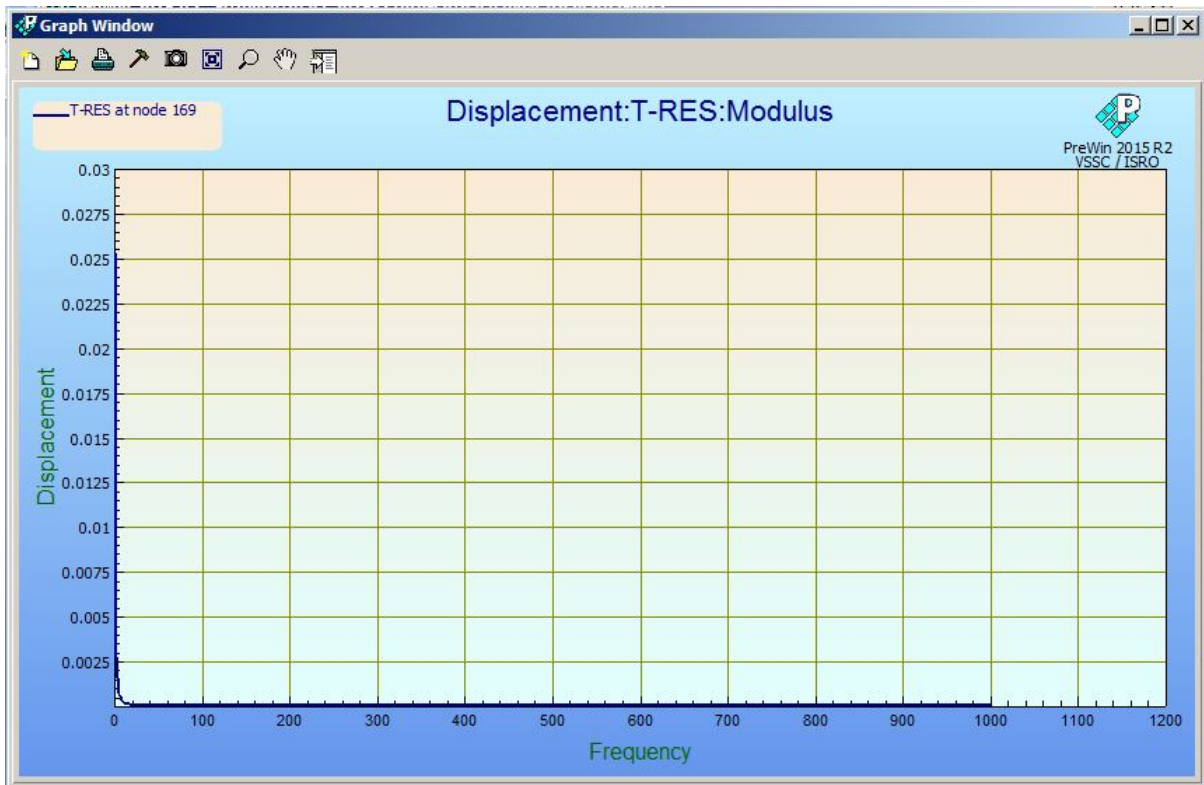
a) Displacement plot

Command : POST, HISTORYPLOT

Menu : Post → History Plot

Item	Displacement
Component	T-RES
Nodes	169
Complex As	Modulus
Graph Plot to	New window

At the end of the above operations, your screen should look like this



b) velocity plot

Command : POST, HISTORYPLOT

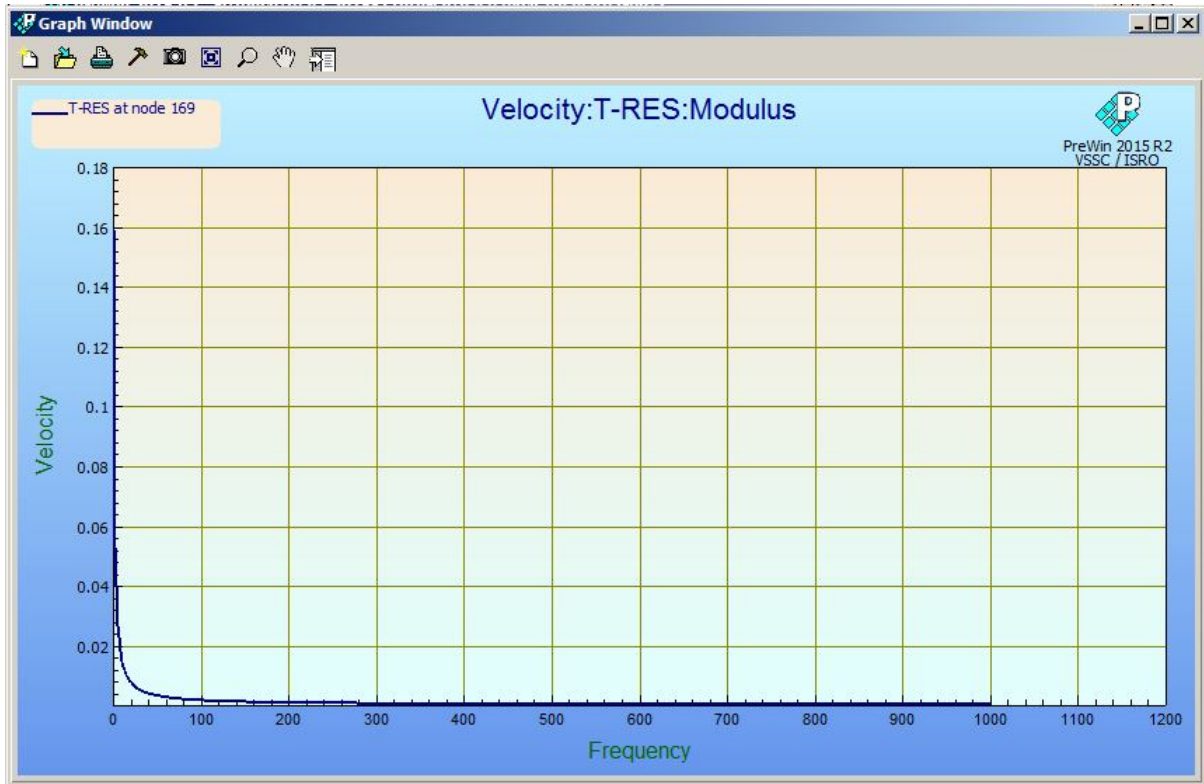
Menu : Post → History Plot

Parameters :

Item	Velocity
Component	T-RES
Nodes	169
Complex As	Real

At
above operations, your screen should look like this

the end of the



c) Acceleration plot

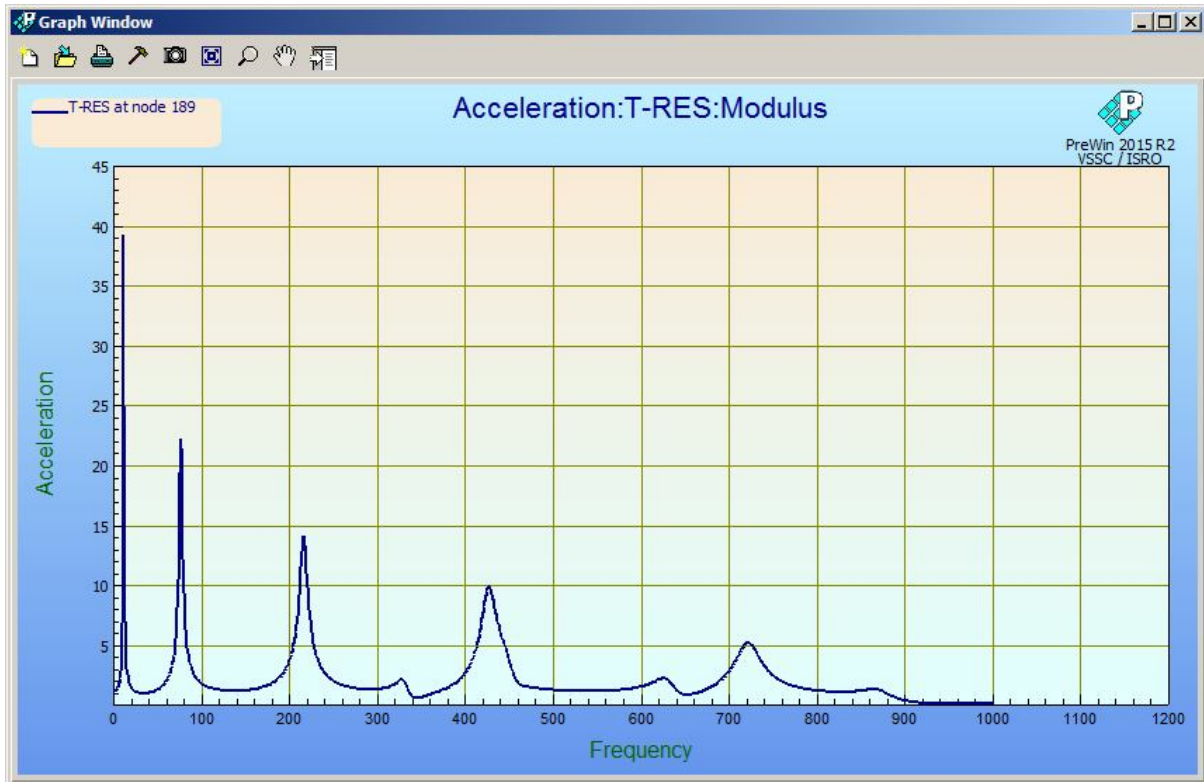
Command : POST, HISTORYPLOT

Menu : Post → History Plot

Parameters:

Item	Acceleration
Component	T-RES
Nodes	189
Complex As	Real

At the end of the above operations a graph as shown appears in the viewport.



d) Natural frequencies

Command : POST, VIEWRESULTS

Menu : Post → View Results

Parameters :

Item	Frequencies
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At the end of the above operations table as shown below.

Mode	Frequency(Hz)
1	12.3976
2	53.0862
3	77.2444
4	172.615
5	217.065
6	330.914
7	331.752
8	427.117
9	452.156
10	546.553
11	631.395
12	721.961
13	824.799
14	873.372
15	888.286

e) Output can be seen in *.OUT