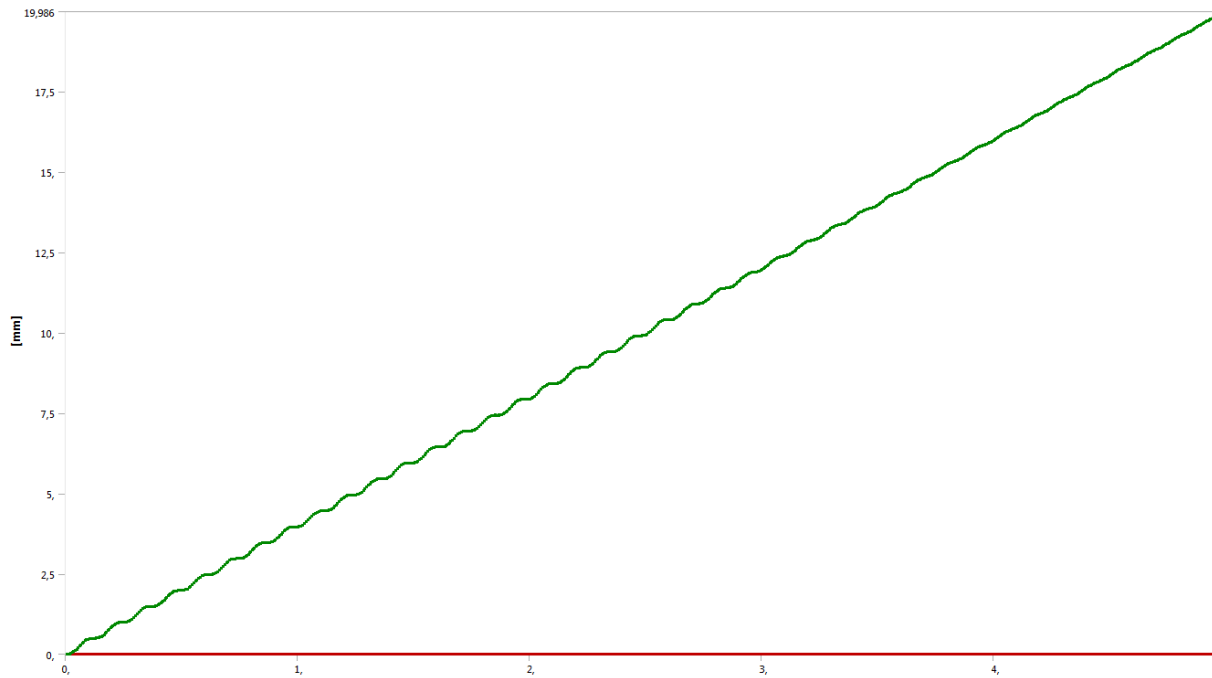
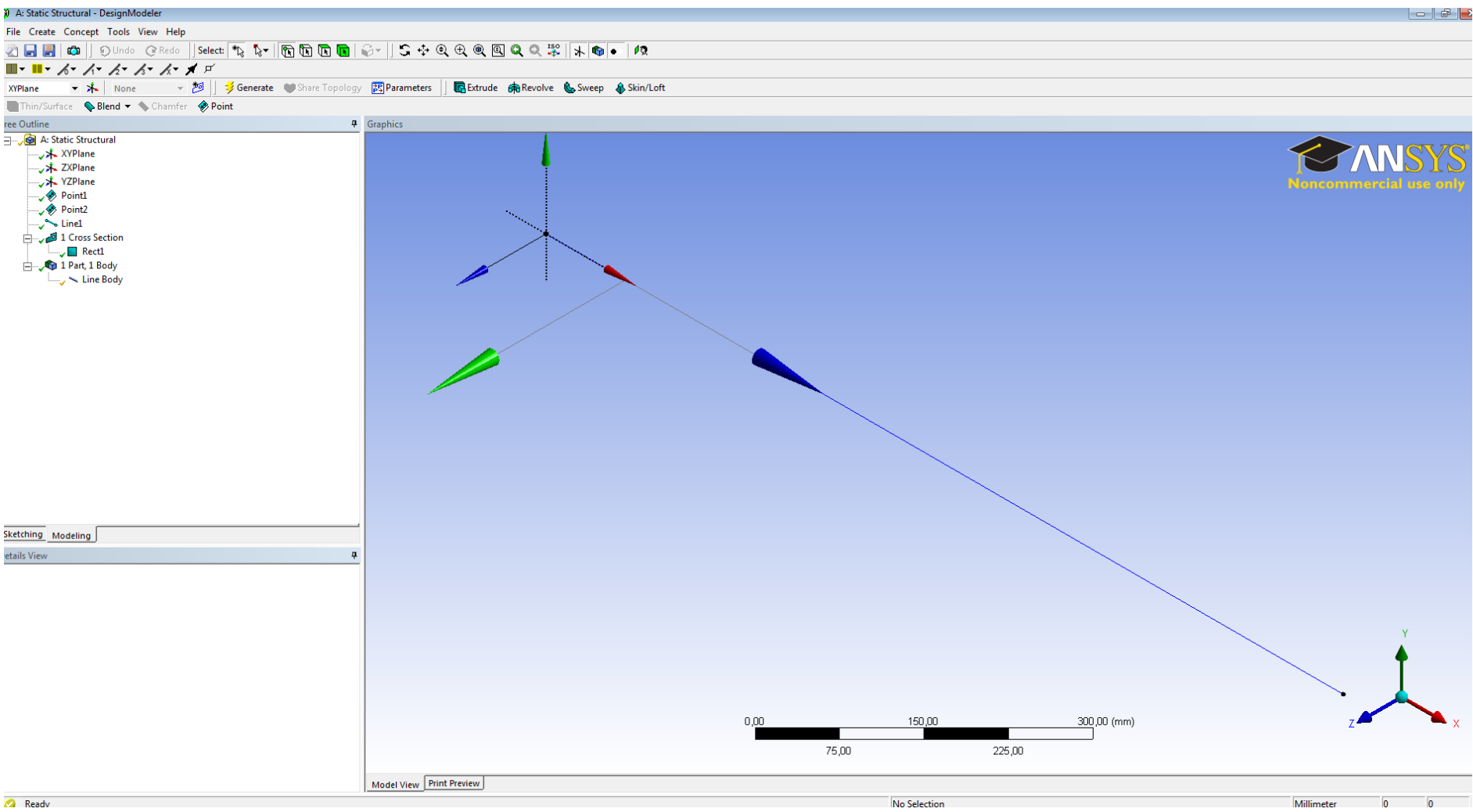


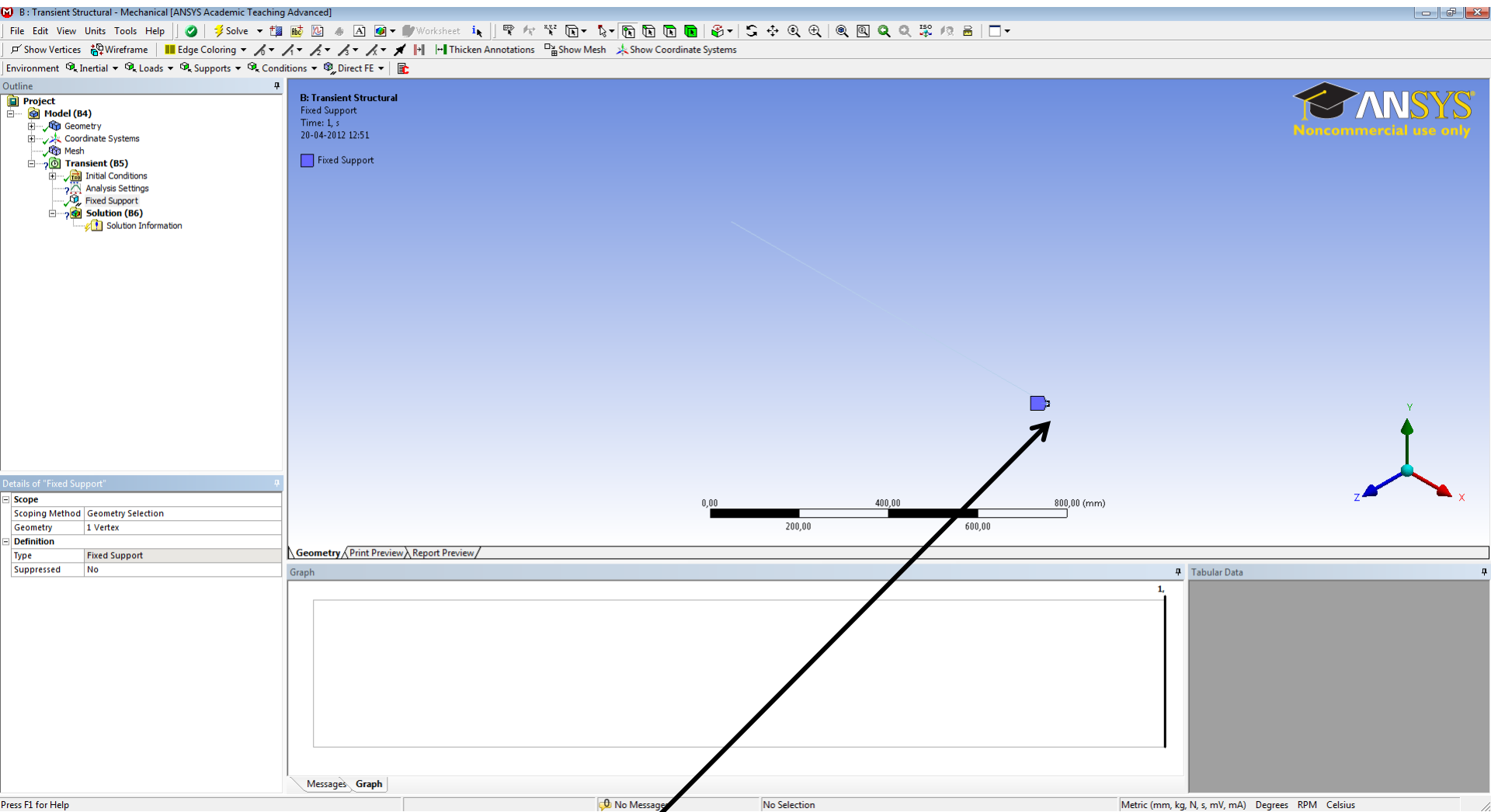
Transient beam analysis Workbench 14.0



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Make a beam model or for this example download the Transient Beam Geometry from the homepage.



Use a fixed support in one of the ends.

The result from a modal analysis

0,00 200,00 400,00 600,00 800,00 (mm)

Geometry | Print Preview | Report Preview

Graph

Tabular Data

Mode	Frequency [Hz]
1	8,1532
2	8,1532
3	51,071
4	51,071
5	142,9
6	142,9

Details of "Analysis Settings"

Step Controls

- Number Of Steps: 1,
- Current Step Number: 1,
- Step End Time: 1, s
- Auto Time Stepping: On
- Define By: Time
- Initial Time Step: 0,006134
- Minimum Time Step: 0, s
- Maximum Time Step: 0, s
- Time Integration: On

Solver Controls

- Solver Type: Program Controlled
- Weak Springs: Program Controlled
- Large Deflection: On

Restart Controls

- Nonlinear Controls
- Output Controls
- Damping Controls
- Analysis Data Management

Press F1 for Help

No Messages No Selection Metric (mm, kg, N, s, mV, mA) Degrees RPM Celsius

Now setup the Initial time step. A general rule is twenty points per cycle at the response frequency. $\text{Time step} = 1/(20f)$
 $\text{Time step} = 1/(20f) = 1/(20 \cdot 8,15) = 0,00613$

B : Transient Structural - Mechanical [ANSYS Academic Teaching Advanced]

File Edit View Units Tools Help | Solve | Worksheet | Show Vertices | Wireframe | Edge Coloring | Thicken Annotations | Show Mesh | Show Coordinate Systems

Environment | Inertial | Loads | Supports | Conditions | Direct FE

Outline

- Project
 - Model (B4)
 - Geometry
 - Coordinate Systems
 - Mesh
 - Transient (B5)
 - Initial Conditions
 - Analysis Settings
 - Fixed Support
 - Solution (B6)
 - Solution Information

Details of "Analysis Settings"

Step Controls

- Number Of Steps: 1
- Current Step Number: 1
- Step End Time: 1, s
- Auto Time Stepping: On
- Define By: Time
- Initial Time Step: 6,134e-003 s
- Minimum Time Step: 1,e-003 s
- Maximum Time Step: 0,1 s
- Time Integration: On

Solver Controls

- Solver Type: Program Controlled
- Weak Springs: Program Controlled
- Large Deflection: On

Restart Controls

- Nonlinear Controls
- Output Controls
- Damping Controls
- Analysis Data Management

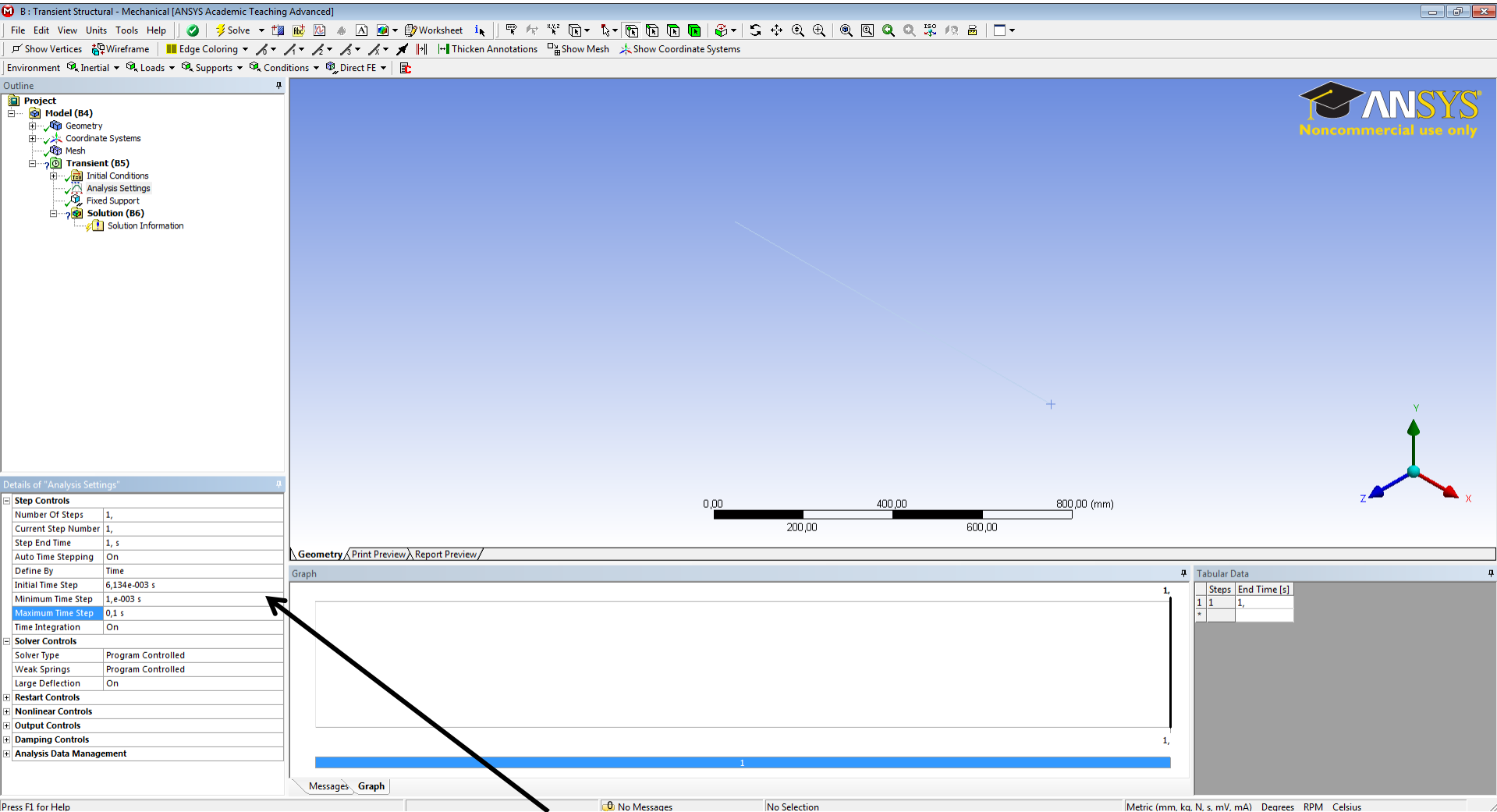
Geometry | Print Preview | Report Preview

Graph

Steps	End Time [s]
1	1,

Messages | Graph

No Messages | No Selection | Metric (mm, ka, N, s, mV, mA) | Degrees | RPM | Celsius



Then setup the lower and upper time step.

B : Transient Structural - Mechanical [ANSYS Academic Teaching Advanced]

File Edit View Units Tools Help | Solve | Worksheet | Thicken Annotations | Show Mesh | Show Coordinate Systems

Environment | Inertial | Loads | Supports | Conditions | Direct FE

Outline

- Project
 - Model (B4)
 - Geometry
 - Coordinate Systems
 - Mesh
 - Transient (B5)
 - Initial Conditions
 - Analysis Settings
 - Fixed Support
 - Solution (B6)
 - Solution Information

Details of "Analysis Settings"

Step Controls

- Number Of Steps: 1
- Current Step Number: 1
- Step End Time: 20, s
- Auto Time Stepping: On
- Define By: Time
- Initial Time Step: 6,134e-003 s
- Minimum Time Step: 1,e-003 s
- Maximum Time Step: 0,1 s
- Time Integration: On

Solver Controls

- Solver Type: Program Controlled
- Weak Springs: Program Controlled
- Large Deflection: On

Restart Controls

Nonlinear Controls

Output Controls

Damping Controls

Analysis Data Management

Geometry | Print Preview | Report Preview

Graph

Tabular Data

Steps	End Time [s]
1	20,
*	

Set the "Step End Time" to 20,s

B: Transient Structural - Mechanical [ANSYS Academic Teaching Advanced]

File Edit View Units Tools Help

Environment Inertial Loads Supports Conditions Direct FE

Outline

- Project
 - Model (B4)
 - Geometry
 - Coordinate Systems
 - Mesh
 - Transient (B5)
 - Initial Conditions
 - Analysis Settings
 - Fixed Support
 - Force
 - Solution (B6)
 - Solution Information

B: Transient Structural

Force
Time: 20, s
20-04-2012 12:56

Force: 100, N
Components: 0,, 100,, 0, N

Details of "Force"

Scope

Scoping Method	Geometry Selection
Geometry	1 Vertex

Definition

Type	Force
Define By	Components
Coordinate System	Global Coordinate System
X Component	Tabular Data
Y Component	Tabular Data
Z Component	Tabular Data
Suppressed	No

Graph

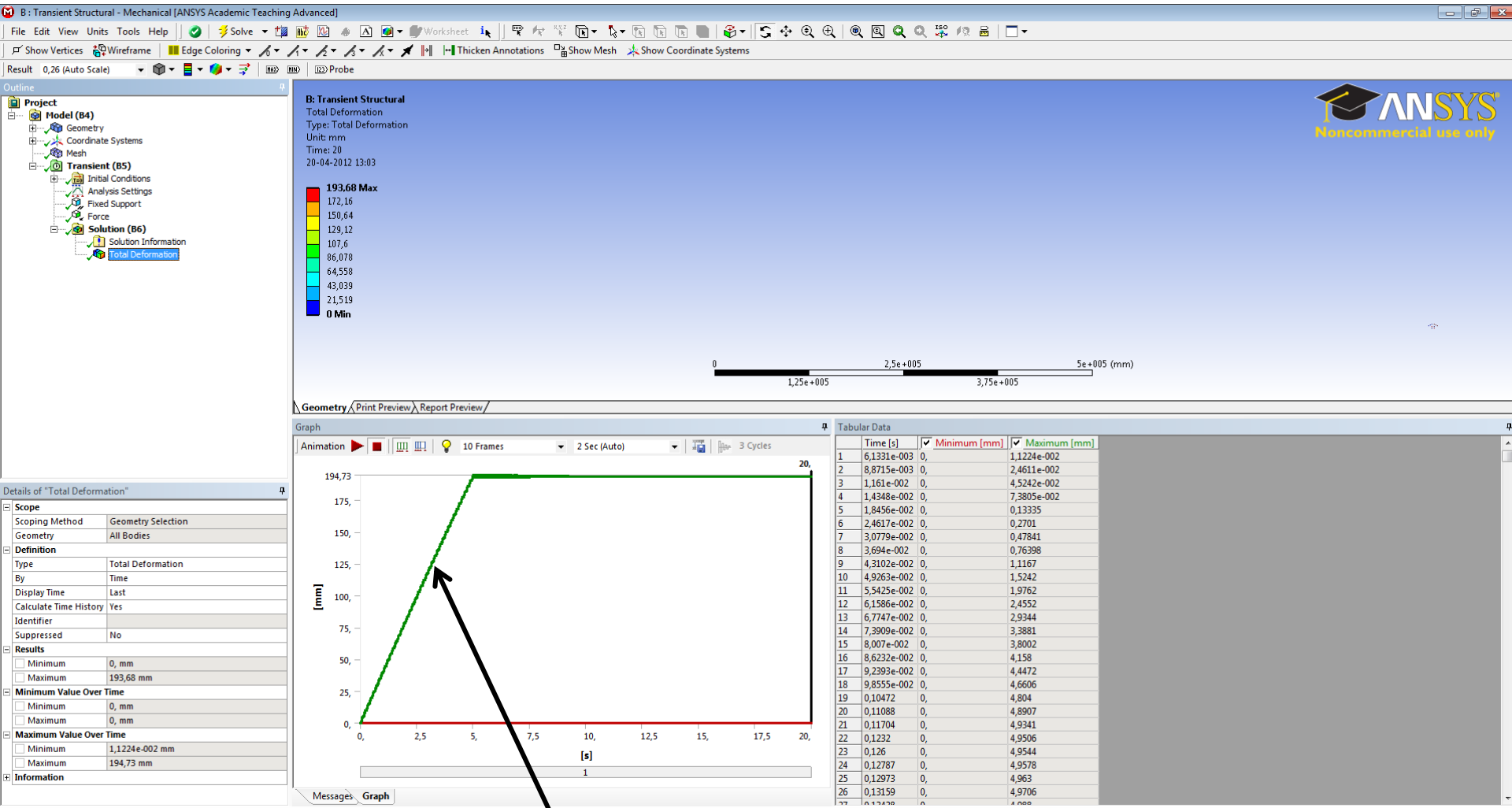
Tabular Data

Steps	Time [s]	X [N]	Y [N]	Z [N]
1	0,	= 0,	0,	= 0,
2	1	5,	0,	100,
3	1	20,	0,	100,

Press F1 for Help

No Messages No Selection Metric (mm, kg, N, s, mV, mA) Degrees RPM Celsius

Add a force and apply the force size as tabular data. Then enter in the tabular so the force will rise to 100 [N] in 5 sec and be static from 5 sec to 20 sec. Then solve



Then plot the "Total deformation" now you can see the dynamic response when the bean is being loaded.