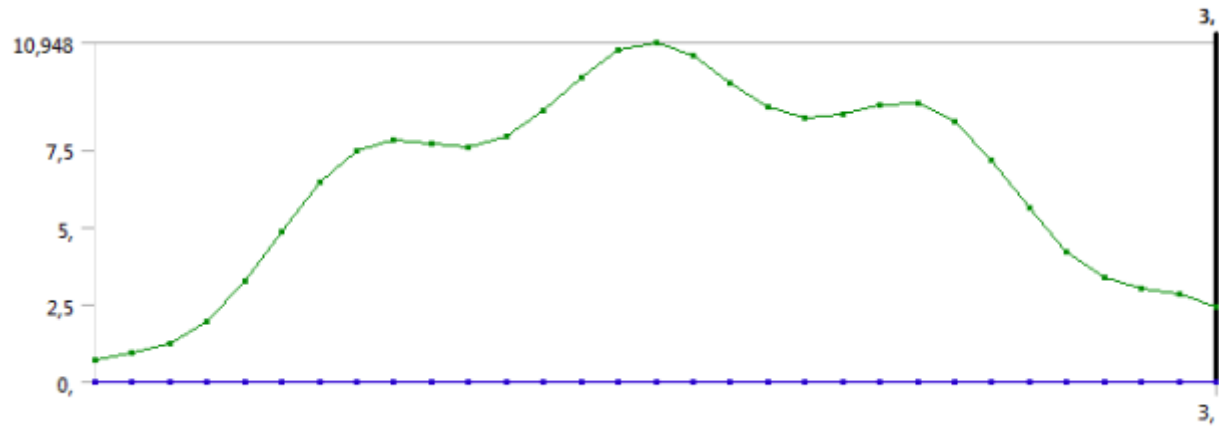
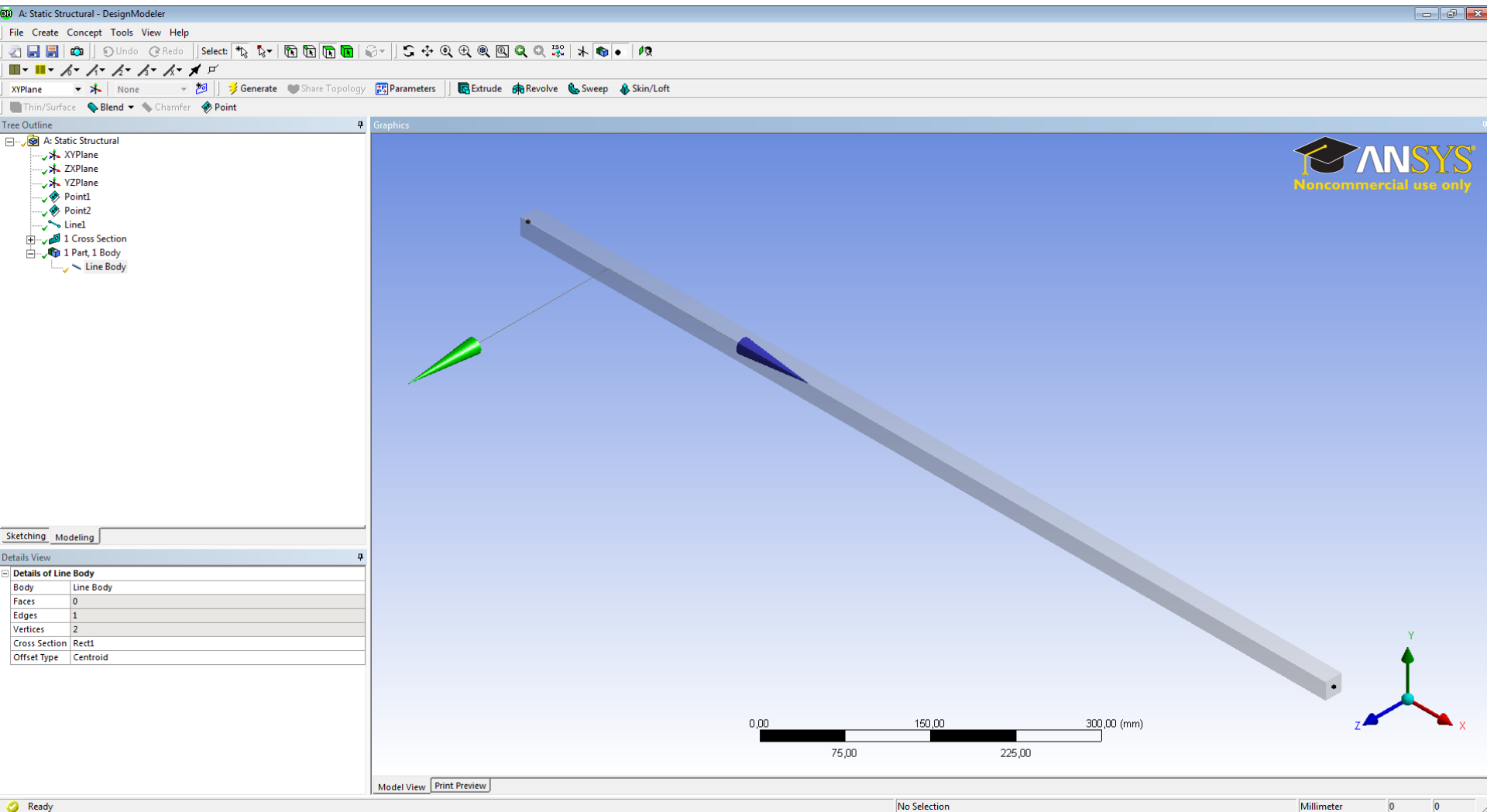


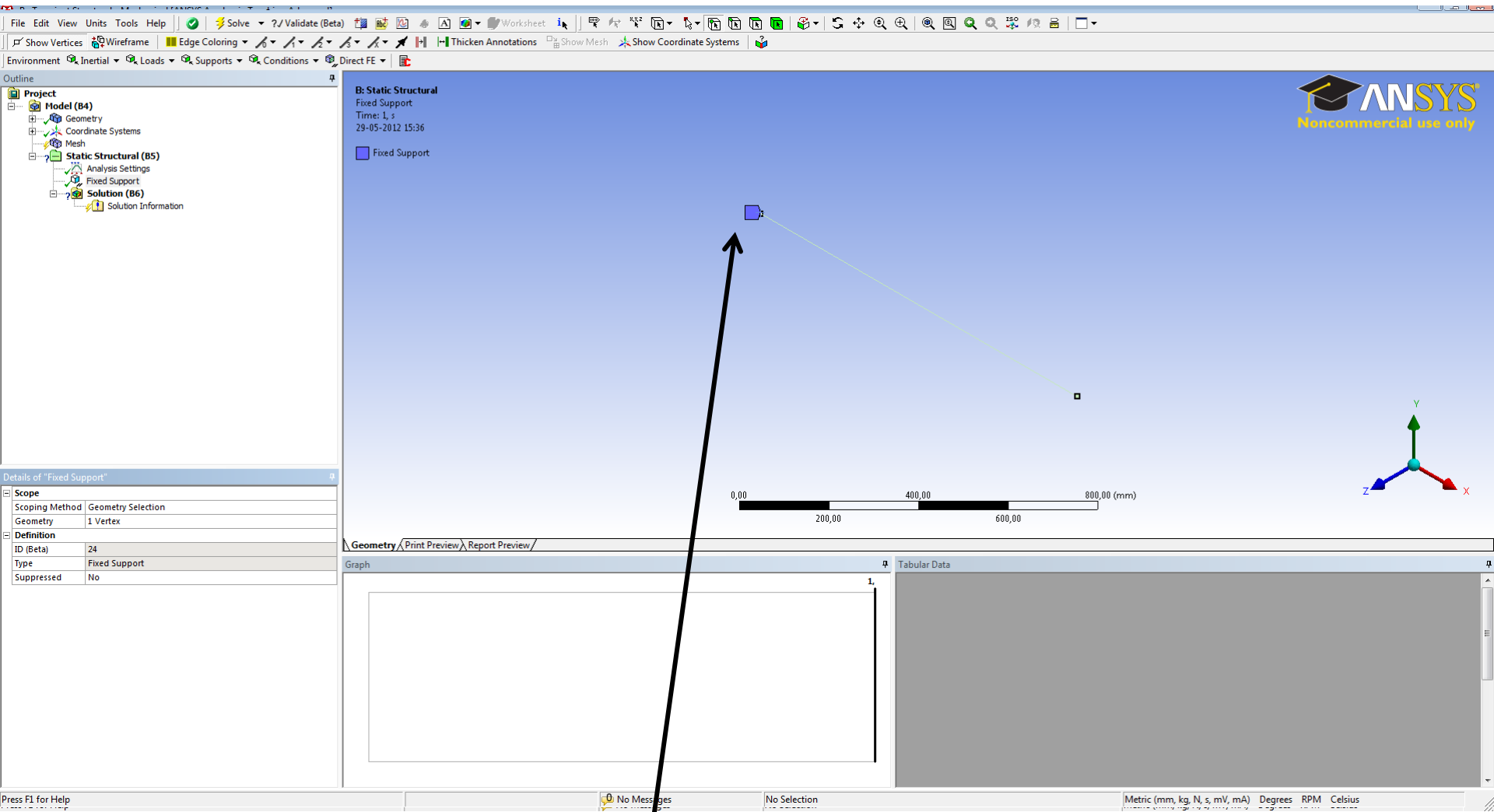
# Insert a transient load in a model Workbench 14.0



Aalborg Universitet Esbjerg  
Søren Heide Lambertsen



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

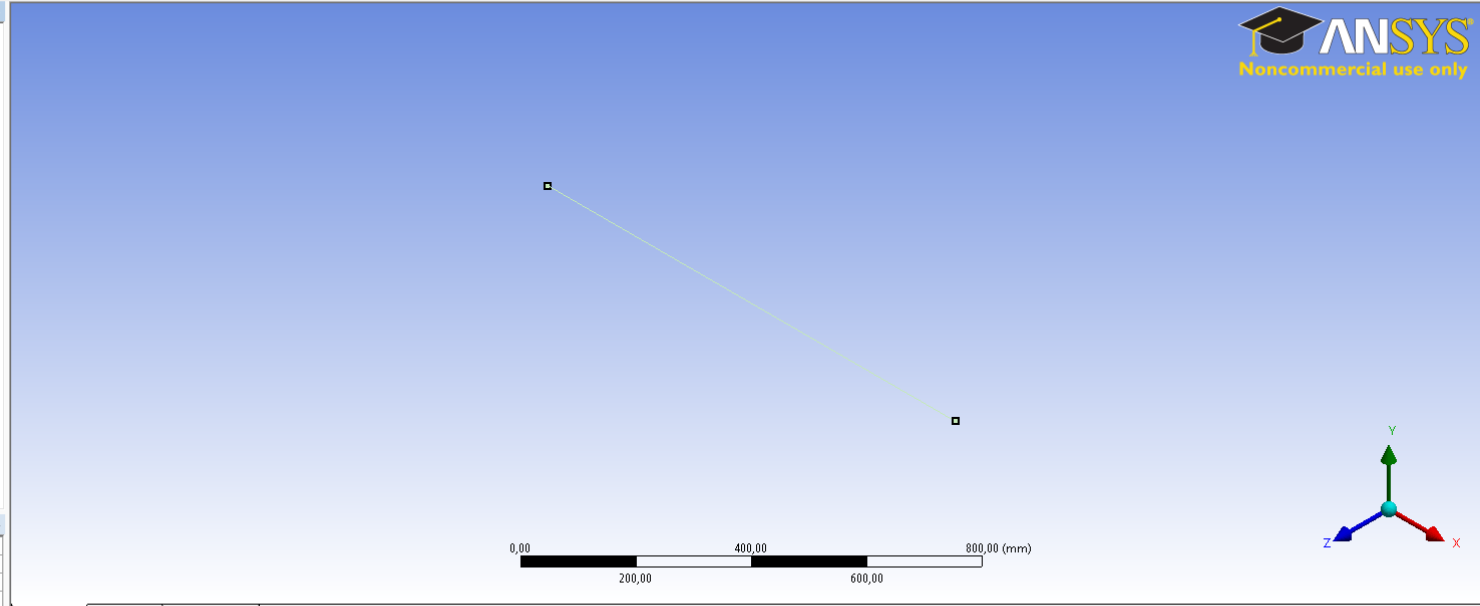


Use a fixed support in one of the ends.



Outline

- Project
  - Model (B4)
    - Geometry
    - Coordinate Systems
    - Mesh
    - Static Structural (B5)
      - 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: 3, s
  - Auto Time Stepping: Program Controlled
- Solver Controls
  - Solver Type: Program Controlled
  - Weak Springs: Program Controlled
  - Large Deflection: Off
  - Inertia Relief: Off
- Restart Controls
- Nonlinear Controls
- Output Controls
- Analysis Data Management

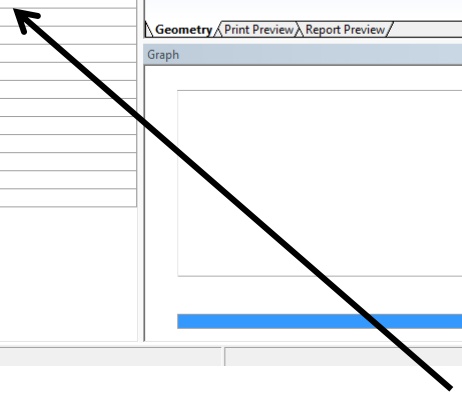
Geometry | Print Preview | Report Preview

Graph

Steps	End Time [s]
1	3,

Tabular Data

Steps	End Time [s]
1	3,

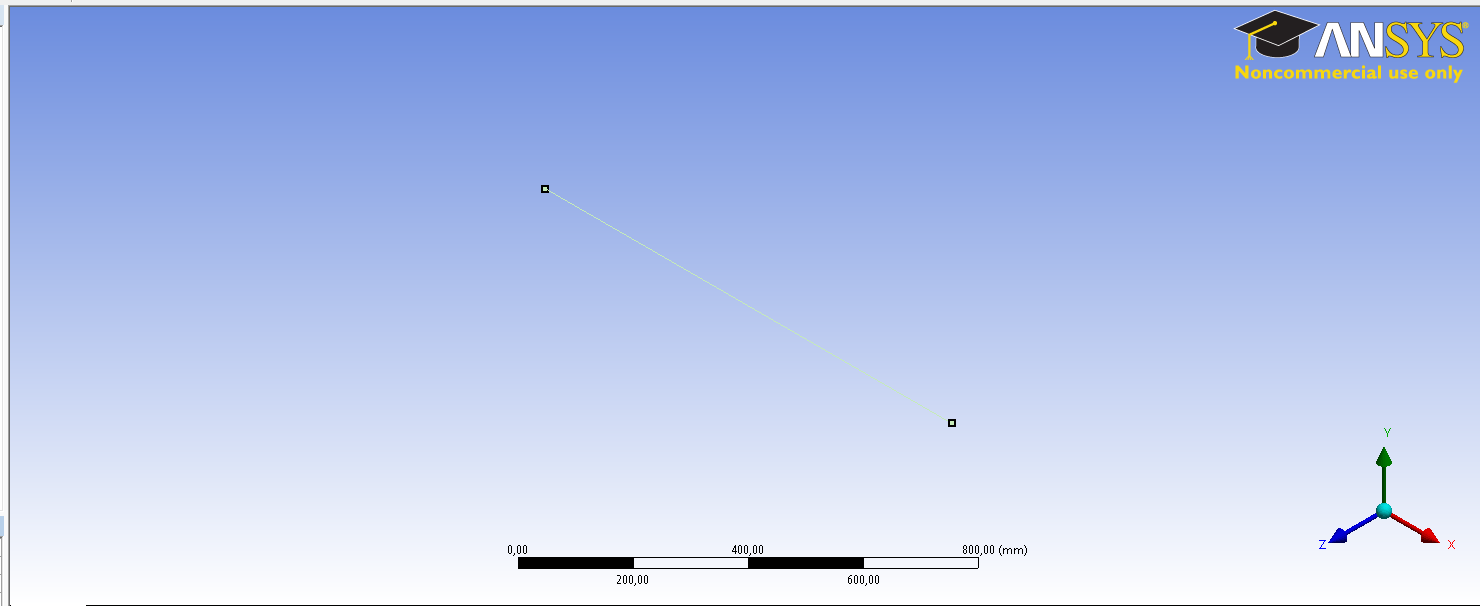


Set the "Step End Time" to 3 sec



Outline

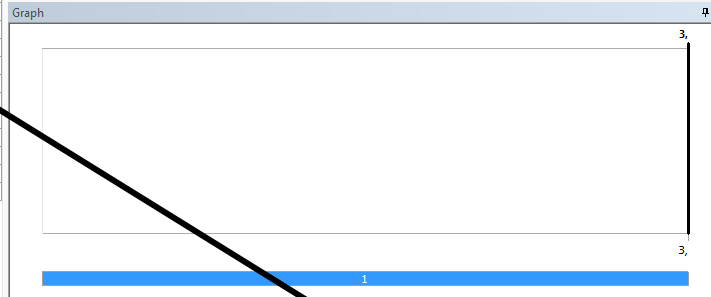
- Project
- Model (B4)
  - Geometry
  - Coordinate Systems
  - Mesh
- Static Structural (B5)
  - Analysis Settings
  - Fixed Support
- Solution (B6)
  - Solution Information



Details of "Analysis Settings"

- Step Controls
  - Number Of Steps: 1
  - Current Step Number: 1
  - Step End Time: 3, s
  - Auto Time Stepping: Off
  - Define By: Substeps
  - Number Of Substeps: 30
- Solver Controls
  - Solver Type: Program Controlled
  - Weak Springs: Program Controlled
  - Large Deflection: Off
  - Inertia Relief: Off
- Restart Controls
- Nonlinear Controls
- Output Controls
- Analysis Data Management

Geometry | Print Preview | Report Preview



Tabular Data

Steps	End Time [s]
1	3,
*	

And define 30 substeps



Outline

- Project
- Model (B4)
  - Geometry
  - Coordinate Systems
  - Mesh
  - Static Structural (B5)
    - Analysis Settings
    - Fixed Support
    - Force
  - Solution (B6)
    - Solution Information

**B: Static Structural**

Force  
Time: 1 s  
29-05-2012 15:36

Force: 0, N  
Components: 0., 0., 0, N

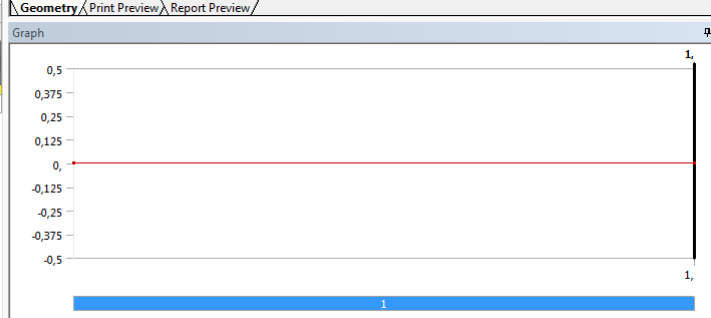
Details of "Force"

Scope

Scoping Method	Geometry Selection
Geometry	1 Vertex

Definition

ID (Beta)	26
Type	Force
Define By	Vector
Magnitude	Components
Direction	Vector
Suppressed	No



Tabular Data

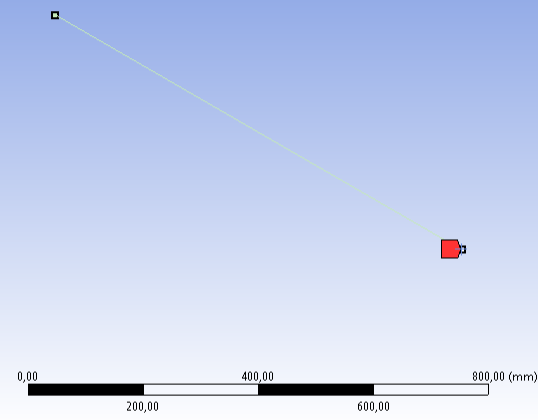
Steps	Time [s]	Force [N]
1	0,	0,
2	1,	0,
*		

Add a force as a components.

Outline

- Project
  - Model (B4)
    - Geometry
    - Coordinate Systems
    - Mesh
  - Static Structural (B5)
    - Analysis Settings
    - Fixed Support
    - Force
  - Solution (B6)
    - Solution Information

B: Static Structural  
Force  
Time: 1, s  
29-05-2012 15:37  
Force: 0, N  
Components: 0,, 0, N



Details of "Force"

Scope	Geometry Selection
Scoping Method	1 Vertex
Geometry	1 Vertex
Definition	
ID (Beta)	26
Type	Force
Define By	Components
Coordinate System	Global Coordinate System
X Component	0, N (ramped)
Y Component	0, N (ramped)
Z Component	0, N (ramped)
Suppressed	No

Geometry / Print Preview / Report Preview /

Graph

Import...  
Export...  
Constant  
Tabular (Time)  
Function

Tabular Data

Steps	Time [s]	X [N]	Y [N]	Z [N]
1	0	0	0	0
2	1	0	0	0
*				

Then chose "Tabular"

D	E
	$10*\text{SIN}(D3)+1*\text{COS}(D4*5)$
0	0,877582562
0,1	1,538636472
0,2	2,05743051
0,3	2,53905523
0,4	3,093039808
0,5	3,804262889
0,6	4,709968047
0,7	5,788533252
0,8	6,96276511
0,9	8,116931282
1	9,123379622
1,1	9,872243887
1,2	10,29697849
1,3	10,38948411
1,4	10,20113262
1,5	9,829449832
1,6	9,393724128
1,7	9,005517843
1,8	8,741304153
1,9	8,623929348
2	8,61743734
2,1	8,636519364
2,2	8,568268797
2,3	8,30090608
2,4	7,752430085
2,5	6,892168222
2,6	5,749934382
2,7	4,410536021
2,8	2,994957235
2,9	1,632805379
3	2,411200081

Make a time series. In this example MS EXCEL is used to make a 3 sec time series.



D	E
	$10*\text{SIN}(D3)+1*\text{COS}(D4*8)$
0	0,696706709
0,1	0,969134644
0,2	1,249299592
0,3	1,956907291
0,4	3,240539802
0,5	4,881754369
0,6	6,421990612
0,7	7,435361791
0,8	7,781912224
0,9	7,687769062
1	7,603616834
1,1	7,927385745
1,2	8,759406602
1,3	9,838586718
1,4	10,69835126
1,5	10,94778243
1,6	10,50744002
1,7	9,656830748
1,8	8,864739326
1,9	8,505341397
2	8,632295681
2,1	8,947837421
2,2	8,985604211
2,3	8,396272468
2,4	7,162713867
2,5	5,614128115
2,6	4,230541943
2,7	3,356220752
2,8	2,995787708
2,9	2,816672299
3	2,411200081

Then copy the time and set it in to the “Tabular data” and copy the load and set it in to “Tabular data Force Y”.

**Project**

- Model (B4)
  - Geometry
  - Coordinate Systems
  - Mesh
- Static Structural (B5)
  - Analysis Settings
  - Fixed Support
  - Force
- Solution (B6)
  - Solution Information

**B: Static Structural**

Force  
Time: 3, s  
29-05-2012 15:42

Force: 2,4112 N  
Components: 0., 2,4112, 0, N

Details of "Force"

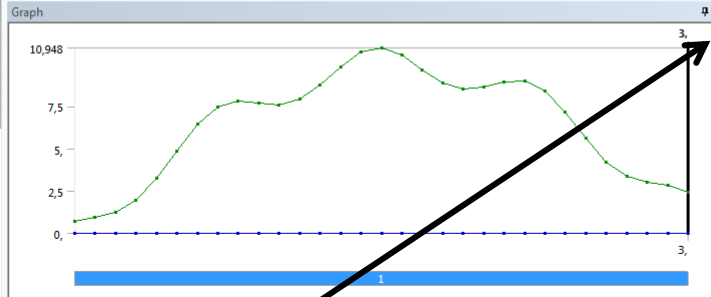
**Scope**

Scoping Method: Geometry Selection  
Geometry: 1 Vertex

**Definition**

ID (Beta): 28  
Type: Force  
Define By: Components  
Coordinate System: Global Coordinate System  
X Component: Tabular Data  
Y Component: Tabular Data  
Z Component: Tabular Data  
Suppressed: No

Geometry | Print Preview | Report Preview



Tabular Data

Steps	Time [s]	X [N]	Y [N]	Z [N]
1	0,	0,	0,69671	0,
2	0,1	0,	0,96913	0,
3	0,2	0,	1,2493	0,
4	0,3	0,	1,9569	0,
5	0,4	0,	3,2405	0,
6	0,5	0,	4,8818	0,
7	0,6	0,	6,422	0,
8	0,7	0,	7,4354	0,
9	0,8	0,	7,7819	0,
10	0,9	0,	7,6878	0,
11	1,	0,	7,6036	0,
12	1,1	0,	7,9274	0,
13	1,2	0,	8,7594	0,
14	1,3	0,	9,8386	0,
15	1,4	0,	10,698	0,

Like this and solve.