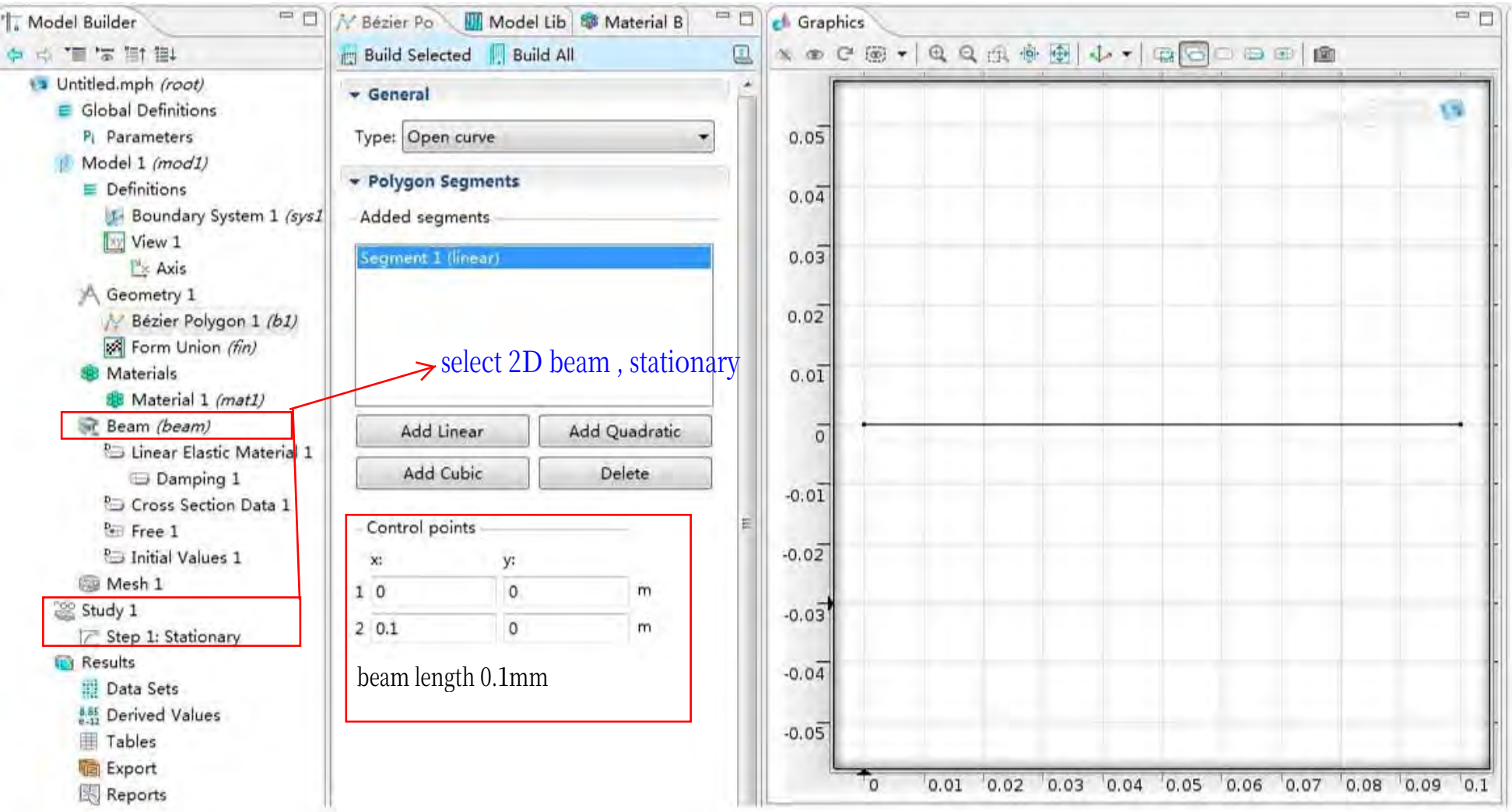
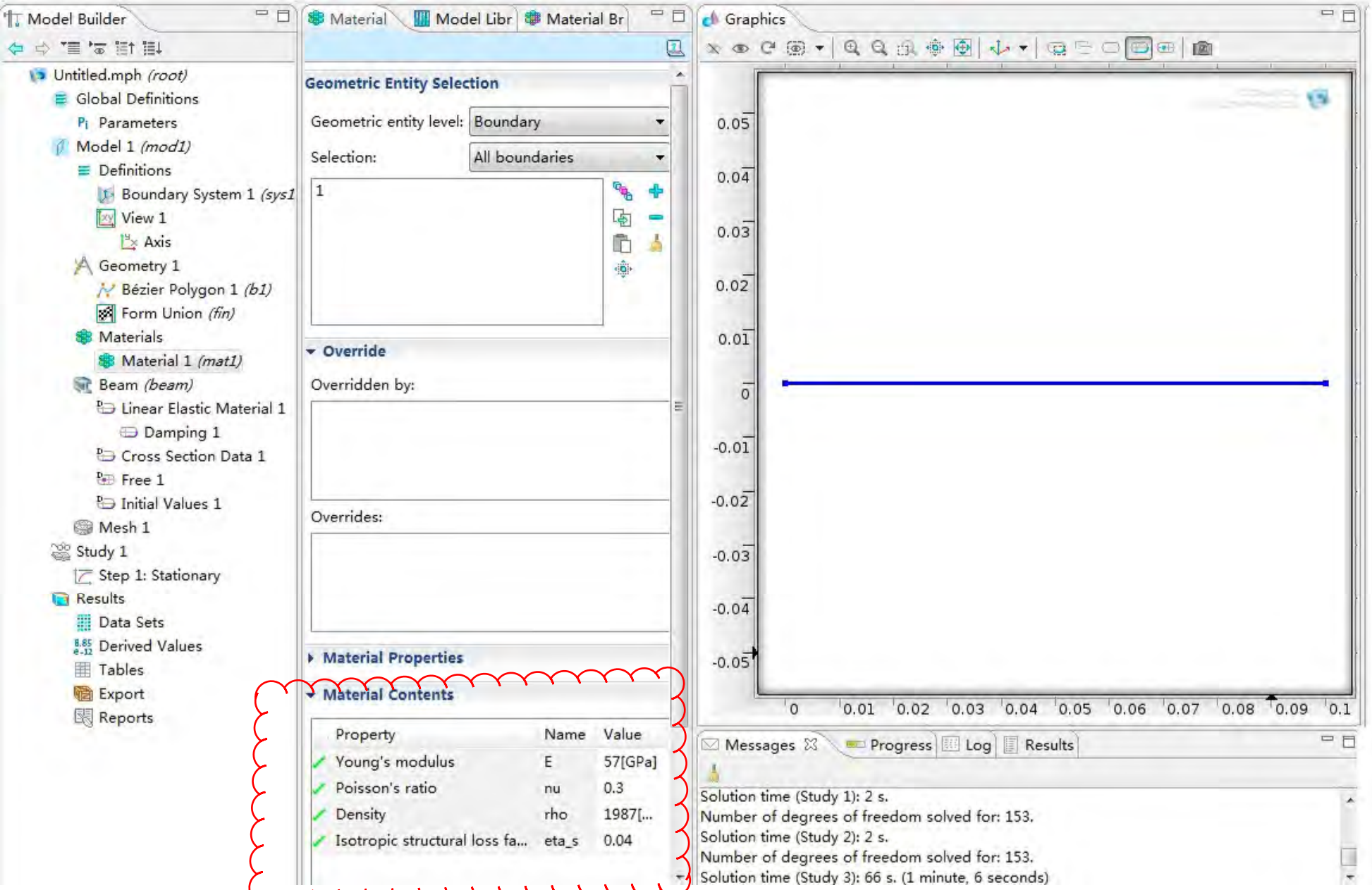
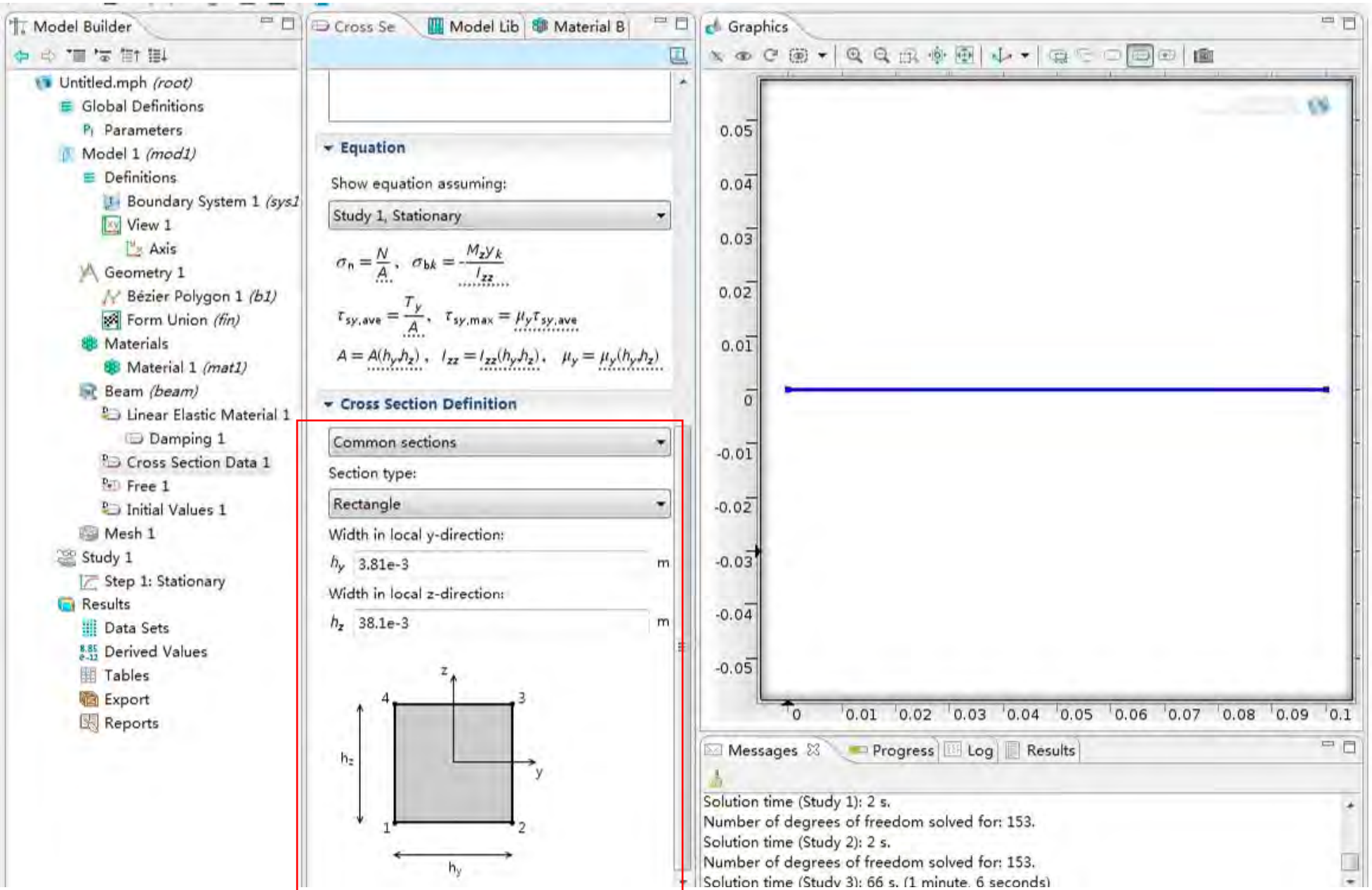
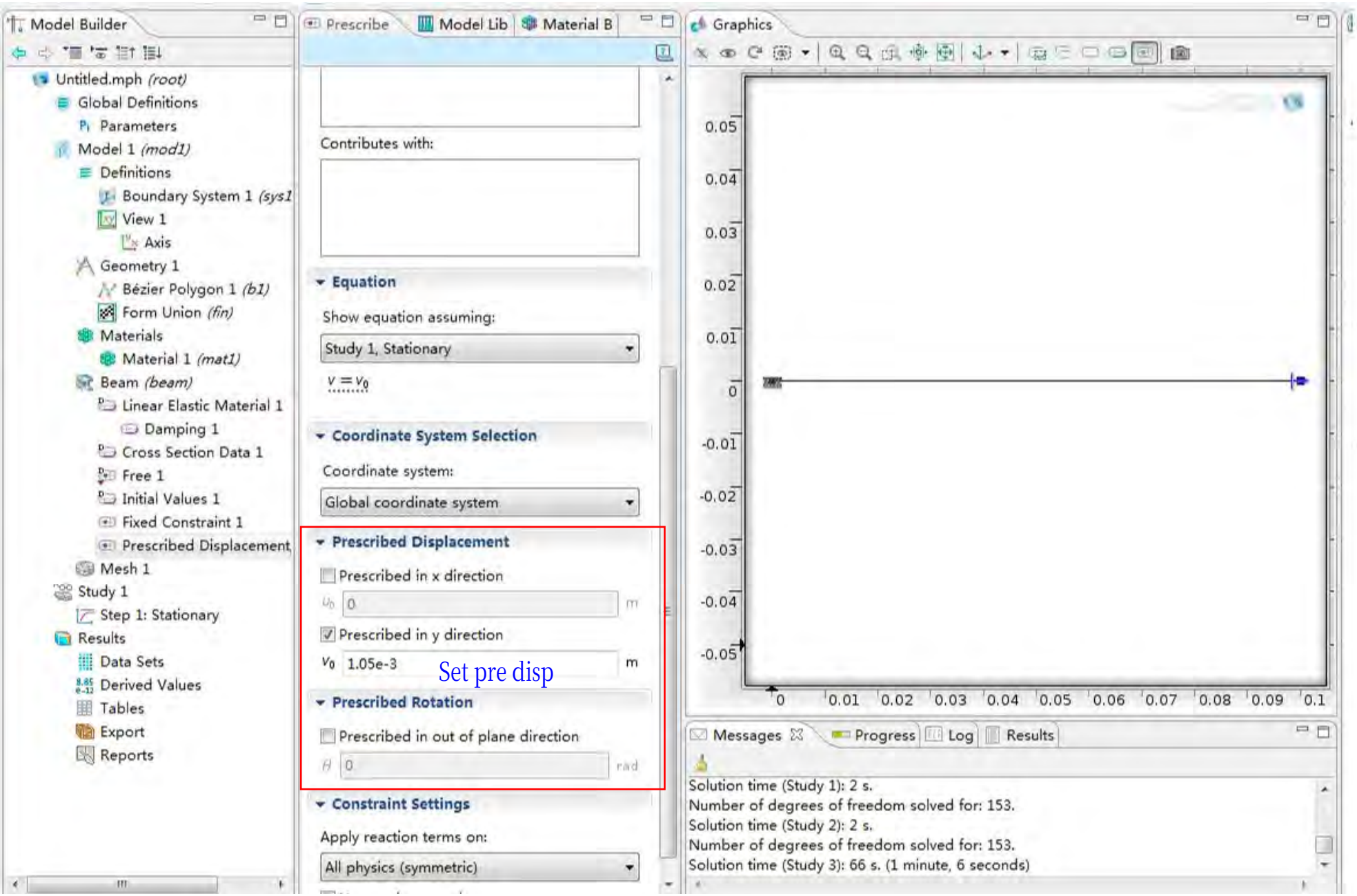

Model Builder
Untitled.mph (root)
Global Definitions
Parameters
Model 1 (mod1)
Definitions
Boundary System 1 (sys1
View 1
Axis
Geometry 1
Bézier Polygon 1 (b1)
Form Union (fin)
Materials
Material 1 (mat1)
Beam (beam)
Linear Elastic Material 1
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Mesh 1
Study 1
Step 1: Stationary
Results
Data Sets
Derived Values
Tables
Export
Reports
Bézier Po
Model Lib
Material B
Build Selected
Build All
General
Type: Open curve
Polygon Segments
Added segments
Segment 1 (linear)
Add Linear
Add Quadratic
Add Cubic
Delete
Control points
x:
y:
1 0 0 m
2 0.1 0 m
beam length 0.1mm
select 2D beam , stationary
Graphics
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1

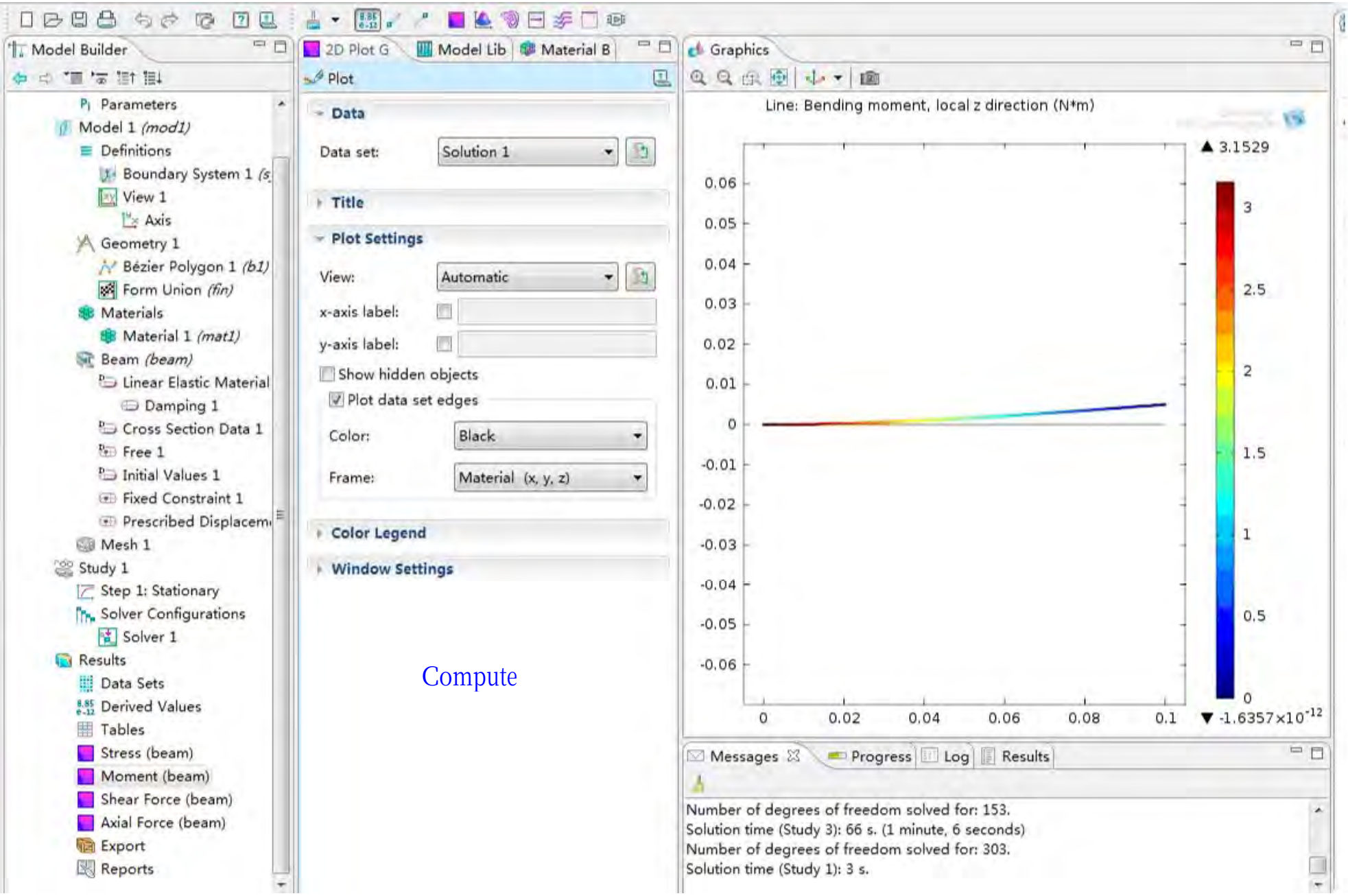


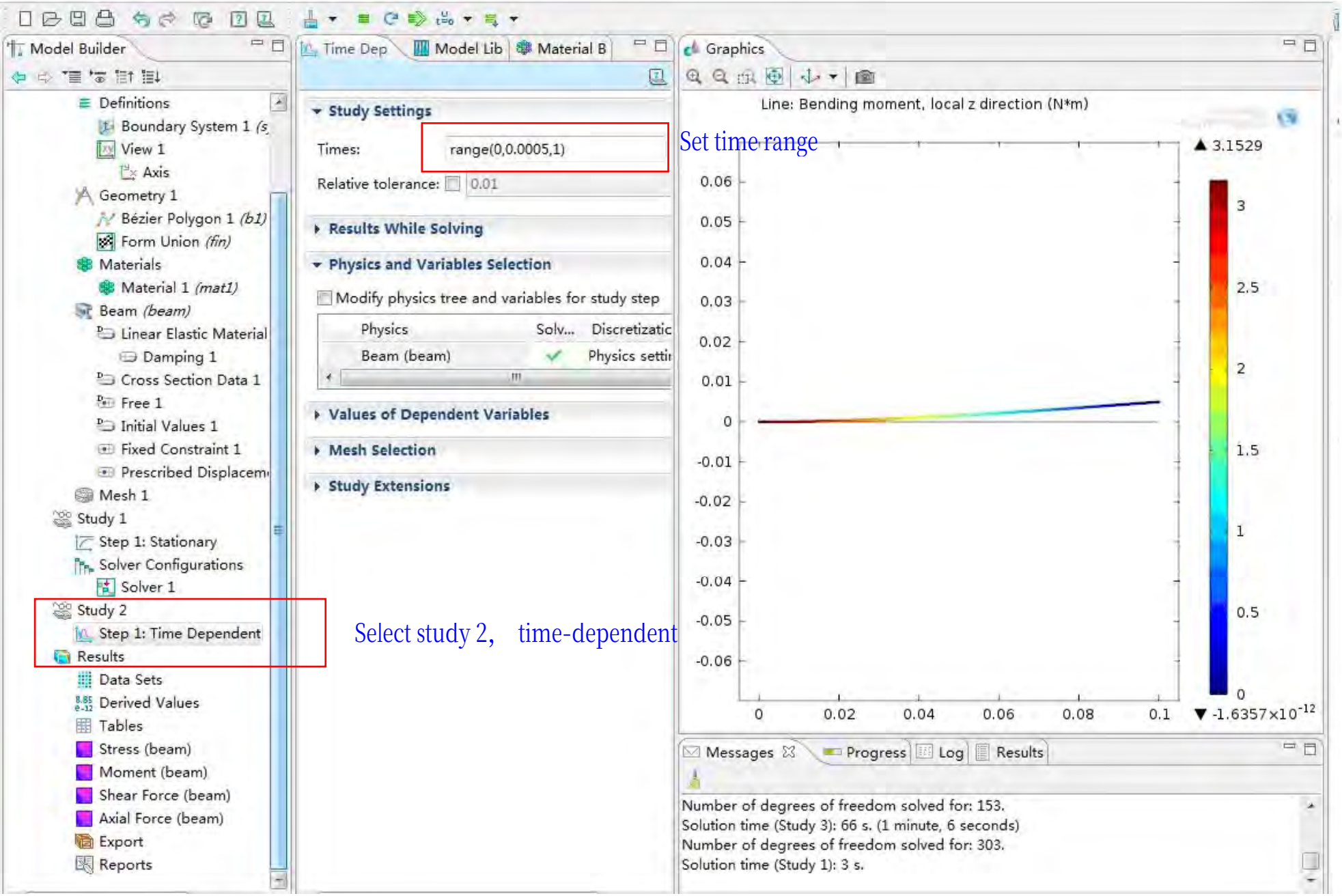
set damp and so on

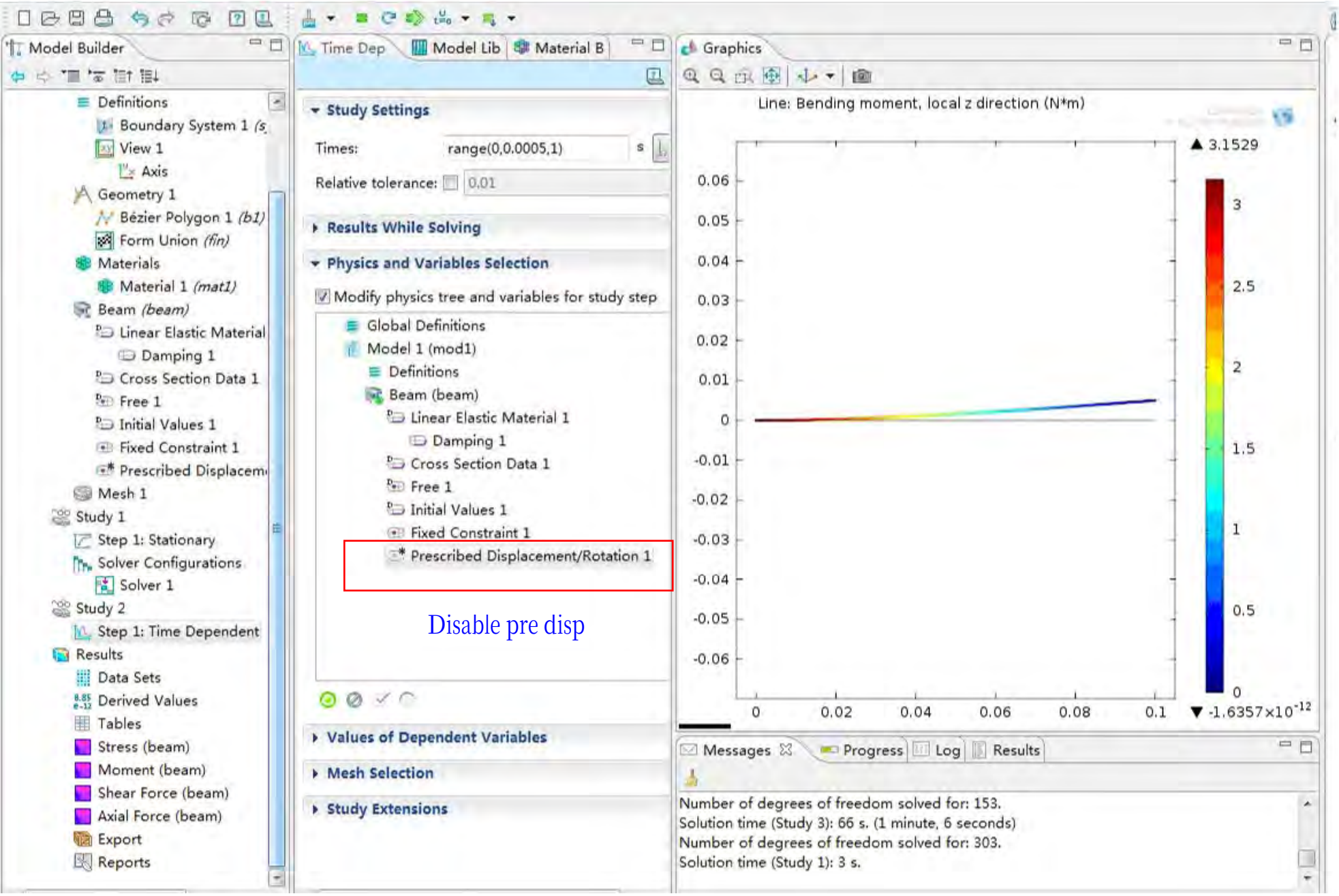


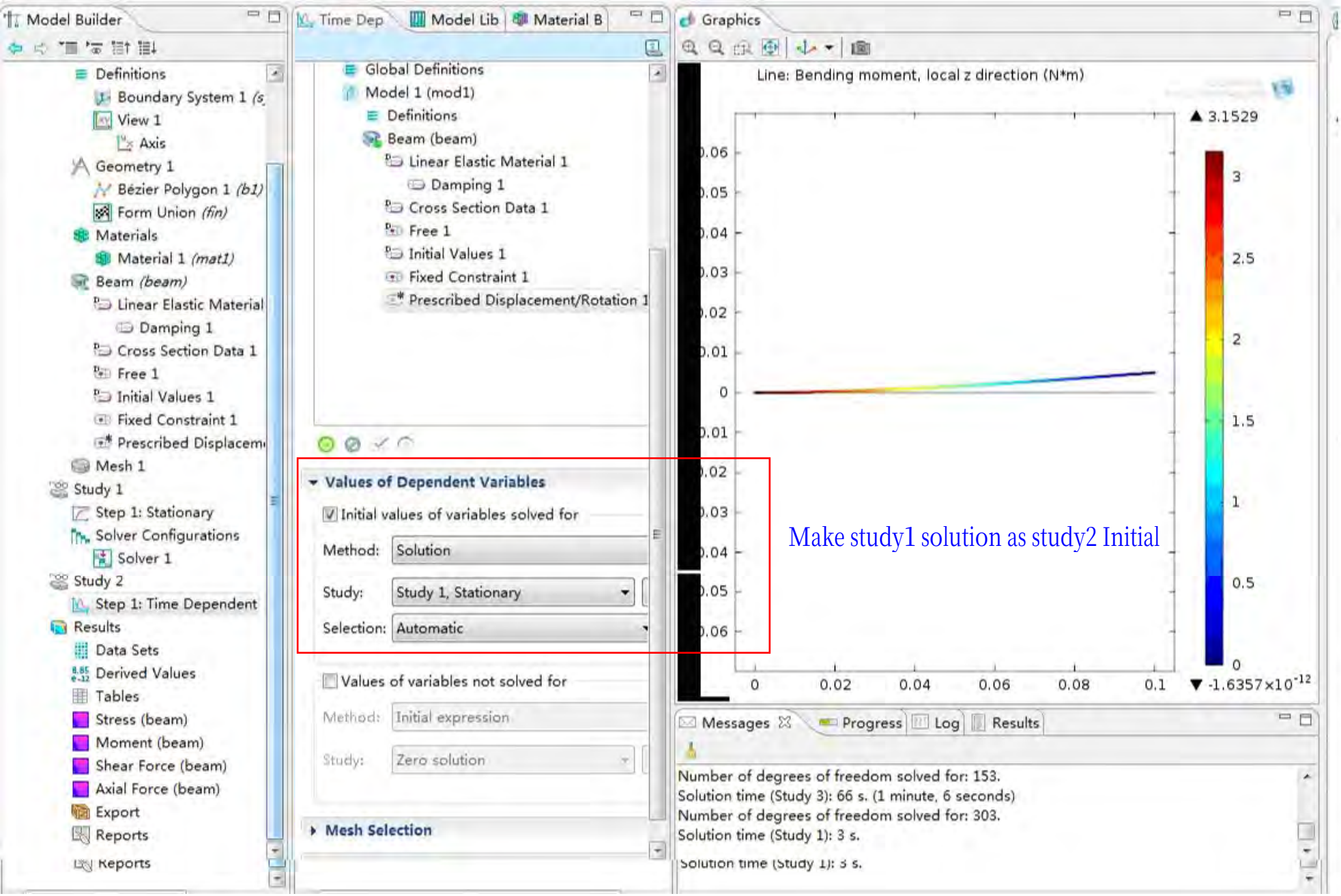
Set cross section


Model Builder
Untitled.mph (root)
Global Definitions
Parameters
Model 1 (mod1)
Definitions
Boundary System 1 (sys1
View 1
Axis
Geometry 1
Bézier Polygon 1 (b1)
Form Union (fin)
Materials
Material 1 (mat1)
Beam (beam)
Linear Elastic Material 1
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacement
Mesh 1
Study 1
Step 1: Stationary
Results
Data Sets
Derived Values
Tables
Export
Reports
Prescribe
Model Lib
Material B
Contributes with:
Equation
Show equation assuming:
Study 1, Stationary
v = v0
Coordinate System Selection
Coordinate system:
Global coordinate system
Prescribed Displacement
Prescribed in x direction
u0 0 m
Prescribed in y direction
v0 1.05e-3 m
Set pre disp
Prescribed Rotation
Prescribed in out of plane direction
θ 0 rad
Constraint Settings
Apply reaction terms on:
All physics (symmetric)
Graphics
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
0 0.01 0.02 0.03 0.04 0.05 0.06 0.07 0.08 0.09 0.1
Messages
Progress
Log
Results
Solution time (Study 1): 2 s.
Number of degrees of freedom solved for: 153.
Solution time (Study 2): 2 s.
Number of degrees of freedom solved for: 153.
Solution time (Study 3): 66 s. (1 minute, 6 seconds)


Model Builder
Parameters
Model 1 (mod1)
Definitions
Boundary System 1 (s
View 1
Axis
Geometry 1
Bézier Polygon 1 (b1)
Form Union (fin)
Materials
Material 1 (mat1)
Beam (beam)
Linear Elastic Material
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacem
Mesh 1
Study 1
Step 1: Stationary
Solver Configurations
Solver 1
Results
Data Sets
Derived Values
Tables
Stress (beam)
Moment (beam)
Shear Force (beam)
Axial Force (beam)
Export
Reports
2D Plot G
Model Lib
Material B
Plot
Data
Data set:
Solution 1
Title
Plot Settings
View:
Automatic
x-axis label:
y-axis label:
Show hidden objects
Plot data set edges
Color:
Black
Frame:
Material (x, y, z)
Color Legend
Window Settings
Compute
Graphics
Line: Bending moment, local z direction (N*m)
▲ 3.1529
3
2.5
2
1.5
1
0.5
0
▼ -1.6357×10^-12
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
0
0.02
0.04
0.06
0.08
0.1
Messages
Progress
Log
Results
Number of degrees of freedom solved for: 153.
Solution time (Study 3): 66 s. (1 minute, 6 seconds)
Number of degrees of freedom solved for: 303.
Solution time (Study 1): 3 s.


Model Builder
Definitions
Boundary System 1 (s
View 1
Axis
Geometry 1
Bézier Polygon 1 (b1)
Form Union (fin)
Materials
Material 1 (mat1)
Beam (beam)
Linear Elastic Material
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacem
Mesh 1
Study 1
Step 1: Stationary
Solver Configurations
Solver 1
Study 2
Step 1: Time Dependent
Results
Data Sets
Derived Values
Tables
Stress (beam)
Moment (beam)
Shear Force (beam)
Axial Force (beam)
Export
Reports
Time Dep
Model Lib
Material B
Study Settings
Times:
range(0,0.0005,1)
Relative tolerance:
0.01
Results While Solving
Physics and Variables Selection
Modify physics tree and variables for study step
Physics
Solv...
Discretizatic
Beam (beam)
Physics setti
Values of Dependent Variables
Mesh Selection
Study Extensions
Graphics
Line: Bending moment, local z direction (N*m)
Set time range
▲ 3.1529
3
2.5
2
1.5
1
0.5
0
▼ -1.6357×10-12
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
0
0.02
0.04
0.06
0.08
0.1
Select study 2, time-dependent
Messages
Progress
Log
Results
Number of degrees of freedom solved for: 153.
Solution time (Study 3): 66 s. (1 minute, 6 seconds)
Number of degrees of freedom solved for: 303.
Solution time (Study 1): 3 s.


Model Builder
Definitions
Boundary System 1 (s
View 1
Axis
Geometry 1
Bézier Polygon 1 (b1)
Form Union (fin)
Materials
Material 1 (mat1)
Beam (beam)
Linear Elastic Material
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacem
Mesh 1
Study 1
Step 1: Stationary
Solver Configurations
Solver 1
Study 2
Step 1: Time Dependent
Results
Data Sets
Derived Values
Tables
Stress (beam)
Moment (beam)
Shear Force (beam)
Axial Force (beam)
Export
Reports
Time Dep
Model Lib
Material B
Study Settings
Times:
range(0,0.0005,1)
s
Relative tolerance:
0.01
Results While Solving
Physics and Variables Selection
Modify physics tree and variables for study step
Global Definitions
Model 1 (mod1)
Definitions
Beam (beam)
Linear Elastic Material 1
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacement/Rotation 1
Disable pre disp
Values of Dependent Variables
Mesh Selection
Study Extensions
Graphics
Line: Bending moment, local z direction (N*m)
▲ 3.1529
3
2.5
2
1.5
1
0.5
0
▼ -1.6357x10^-12
0.06
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
0
0.02
0.04
0.06
0.08
0.1
Messages
Progress
Log
Results
Number of degrees of freedom solved for: 153.
Solution time (Study 3): 66 s. (1 minute, 6 seconds)
Number of degrees of freedom solved for: 303.
Solution time (Study 1): 3 s.


Model Builder
Definitions
Boundary System 1 (s
View 1
Axis
Geometry 1
Bézier Polygon 1 (b1)
Form Union (fin)
Materials
Material 1 (mat1)
Beam (beam)
Linear Elastic Material
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacem
Mesh 1
Study 1
Step 1: Stationary
Solver Configurations
Solver 1
Study 2
Step 1: Time Dependent
Results
Data Sets
Derived Values
Tables
Stress (beam)
Moment (beam)
Shear Force (beam)
Axial Force (beam)
Export
Reports
Reports
Time Dep
Model Lib
Material B
Global Definitions
Model 1 (mod1)
Definitions
Beam (beam)
Linear Elastic Material 1
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacement/Rotation 1
Values of Dependent Variables
Initial values of variables solved for
Method: Solution
Study: Study 1, Stationary
Selection: Automatic
Values of variables not solved for
Method: Initial expression
Study: Zero solution
Mesh Selection
Graphics
Line: Bending moment, local z direction (N*m)
▲ 3.1529
3
2.5
2
1.5
1
0.5
0
▼ -1.6357×10^-12
0.06
0.05
0.04
0.03
0.02
0.01
0
0.01
0.02
0.03
0.04
0.05
0.06
0
0.02
0.04
0.06
0.08
0.1
Make study1 solution as study2 Initial
Messages
Progress
Log
Results
Number of degrees of freedom solved for: 153.
Solution time (Study 3): 66 s. (1 minute, 6 seconds)
Number of degrees of freedom solved for: 303.
Solution time (Study 1): 3 s.
Solution time (Study 1): 3 s.

Time-De | Model Lib | Material B

Compute to Selected | Compute

General

Defined by study step: Step 1: Time Dependent

Time: range(0,0.0005,1)

Relative tolerance: 0.01

Absolute Tolerance

Time Stepping

Method: Generalized alpha

Steps taken by solver: Intermediate

Initial step: 0.0010

Maximum step: 0.1

Time step increase delay: 15

Amplification for high frequency: 0.75

Predictor: Linear

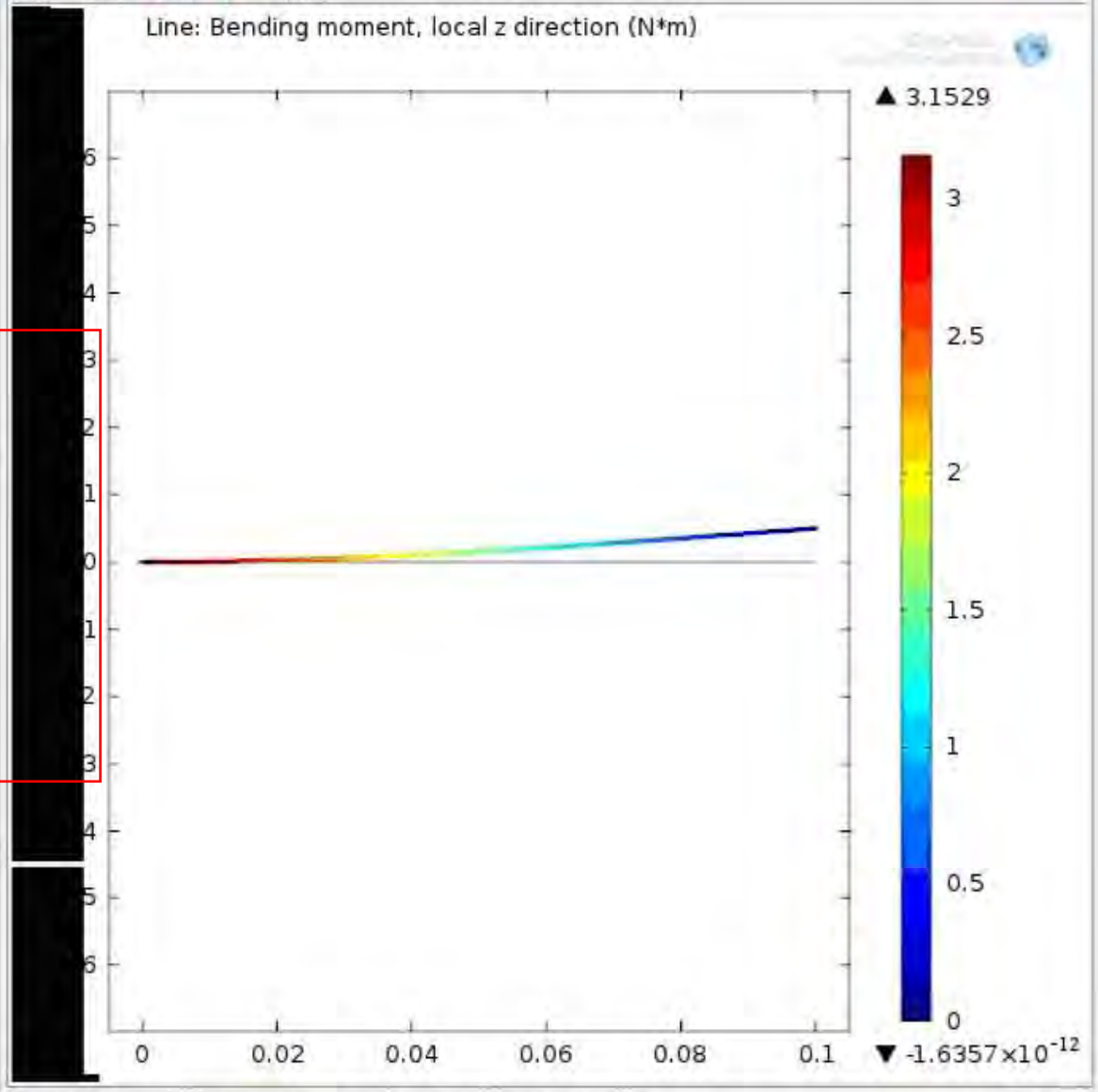
Results While Solving

Output

Advanced

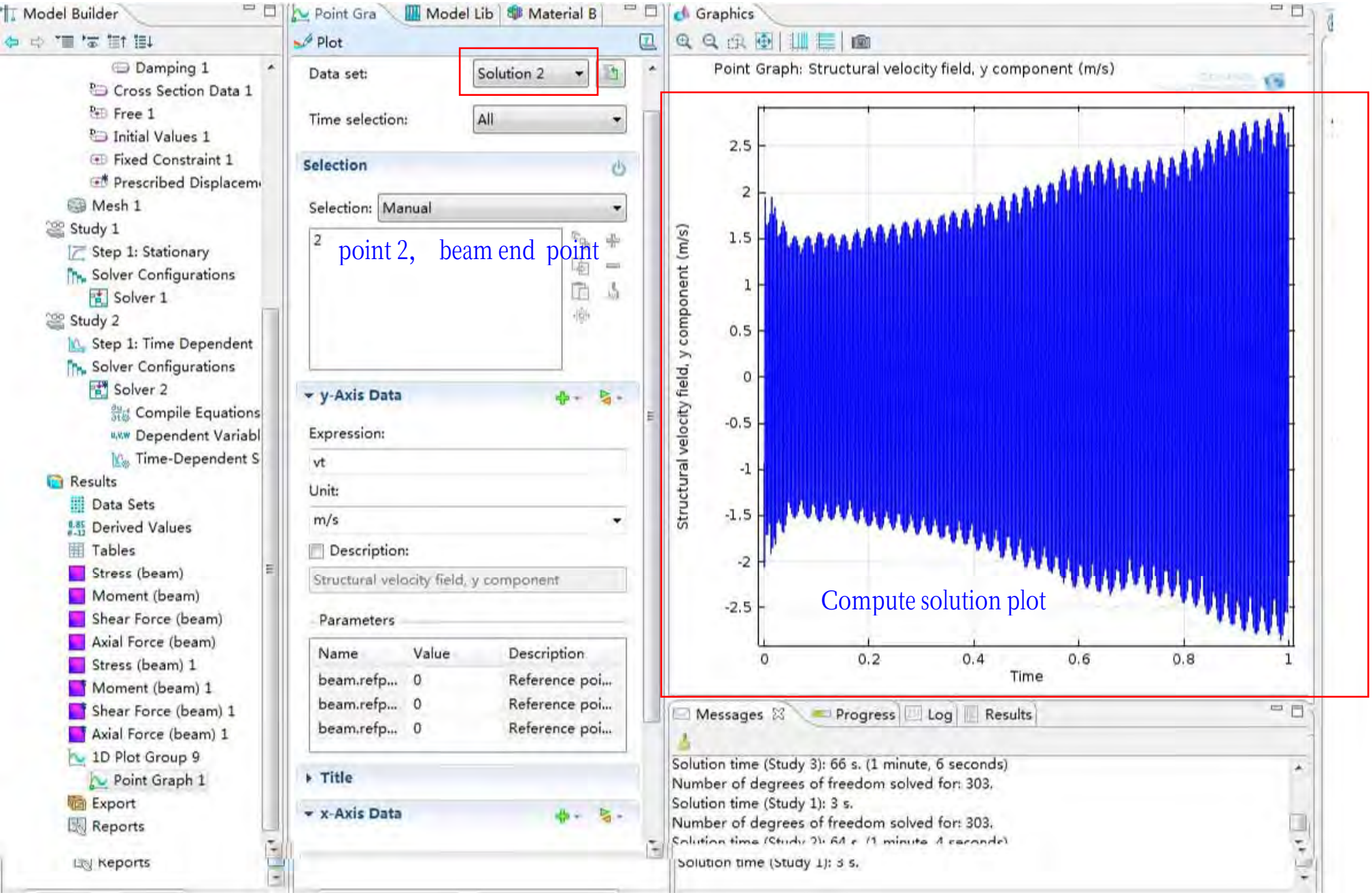
Log

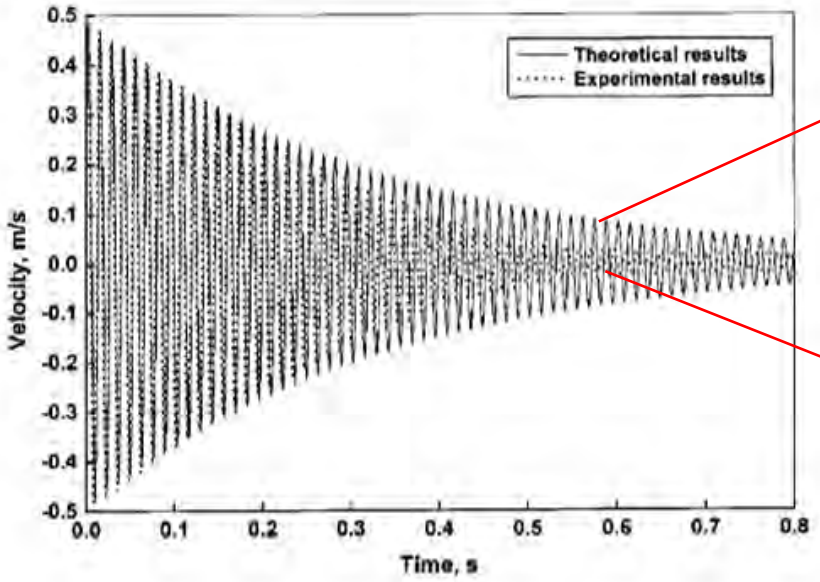
Graphics



Messages | Progress | Log | Results

Number of degrees of freedom solved for: 153.
Solution time (Study 3): 66 s. (1 minute, 6 seconds)
Number of degrees of freedom solved for: 303.
Solution time (Study 1): 3 s.


Model Builder
Damping 1
Cross Section Data 1
Free 1
Initial Values 1
Fixed Constraint 1
Prescribed Displacem
Mesh 1
Study 1
Step 1: Stationary
Solver Configurations
Solver 1
Study 2
Step 1: Time Dependent
Solver Configurations
Solver 2
Compile Equations
Dependent Variabl
Time-Dependent S
Results
Data Sets
Derived Values
Tables
Stress (beam)
Moment (beam)
Shear Force (beam)
Axial Force (beam)
Stress (beam) 1
Moment (beam) 1
Shear Force (beam) 1
Axial Force (beam) 1
1D Plot Group 9
Point Graph 1
Export
Reports
Point Gra
Model Lib
Material B
Plot
Data set:
Solution 2
Time selection:
All
Selection
Selection:
Manual
2
point 2, beam end point
y-Axis Data
Expression:
vt
Unit:
m/s
Description:
Structural velocity field, y component
Parameters
Name
Value
Description
beam.refp...
0
Reference poi...
beam.refp...
0
Reference poi...
beam.refp...
0
Reference poi...
Title
x-Axis Data
Graphics
Point Graph: Structural velocity field, y component (m/s)
Structural velocity field, y component (m/s)
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
0
0.2
0.4
0.6
0.8
1
Time
Compute solution plot
Messages
Progress
Log
Results
Solution time (Study 3): 66 s. (1 minute, 6 seconds)
Number of degrees of freedom solved for: 303.
Solution time (Study 1): 3 s.
Number of degrees of freedom solved for: 303.



Theoretical results

Experimental result

WHY ?