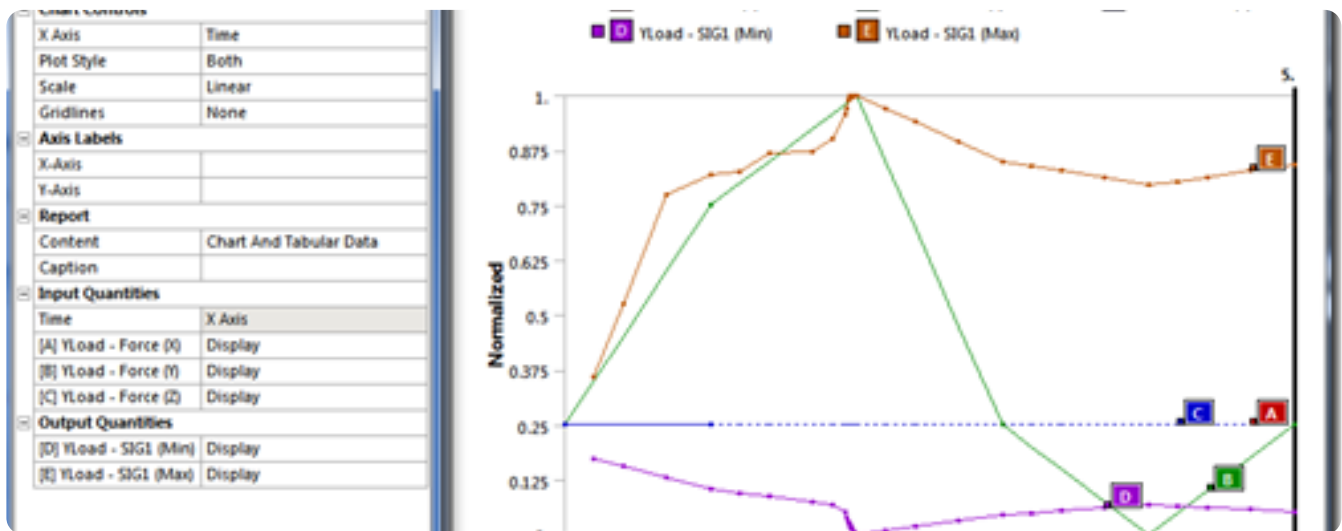


PADT, Inc. – The Blog

WE MAKE INNOVATION WORK

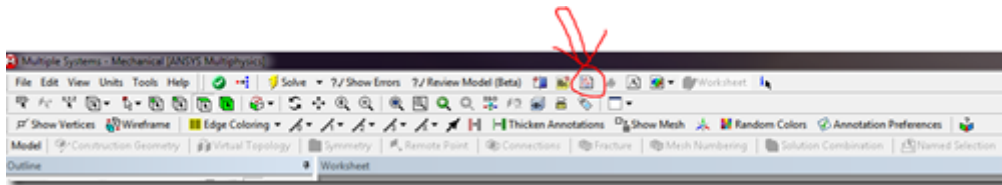


Making Charts and Tables in ANSYS Mechanical

by **Eric Miller** 📅 November 7, 2013 ⌚ 8:26 am 💬 [Leave a comment](#) 📌 [The Focus](#)

🔑 [ANSYS Mechanical, Graphs, Post processing, tables](#)

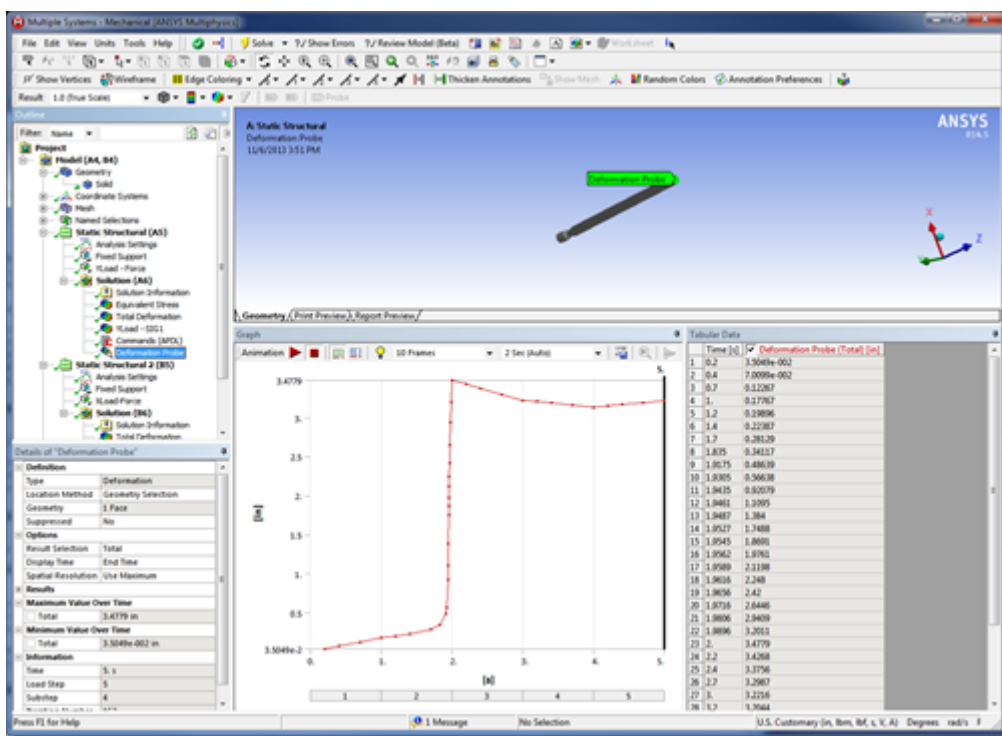
One of the nicer features in ANSYS Mechanical is the fact that when you enter in any type of tabular data, or look at any type of tabular results, you can view it as a table or as a graph. But what if you want to make your own graph, maybe even viewing values from two different solutions? ANSYS Mechanical has a little used feature called “New Chart and Table” that will allow you to make a table or a graph (chart) of quantities in your model tree that make sense when displayed as a graph or table: Time, loads applied over time, and results over time.



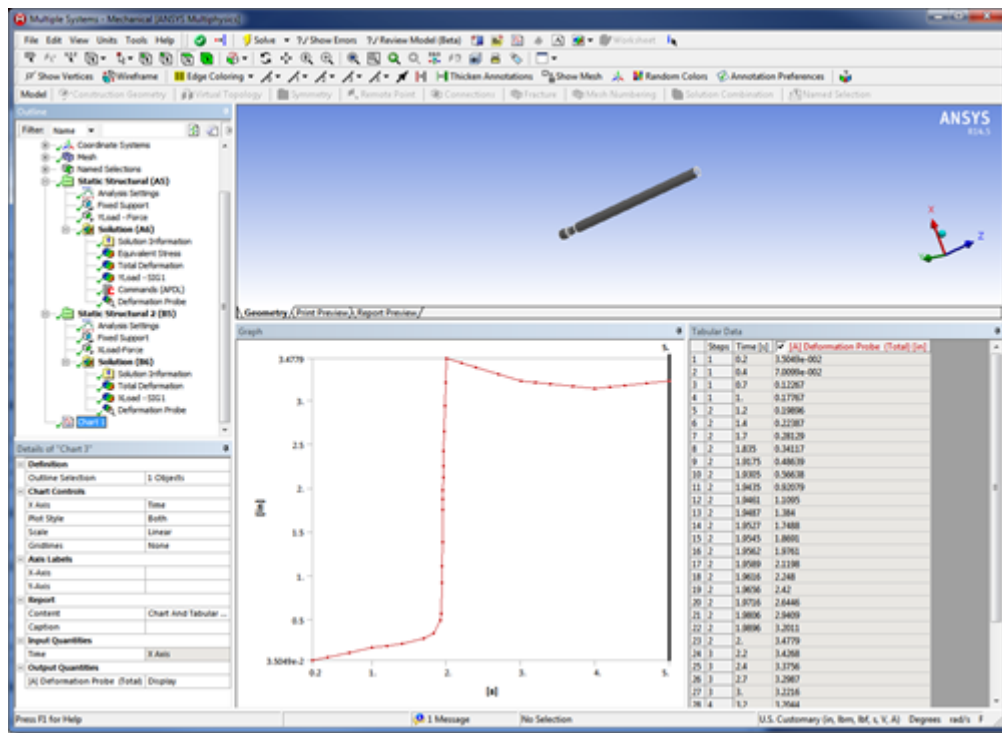
I have found myself exporting data to excel and making graphs all the time. And this is OK if you just do it once. But if you make a change to the model, you need to export again and redo your graph. The Chart and Table function makes this an automatic step, right there in your model tree.

For this posting, we will just use a simple plasticity bending example. We hold the bottom of a round bar with a groove cut in the bottom part and push on the top with forces.

In its simplest form the “Chart and Table” duplicates what you see in the graph and Tabular Data windows when you click on a load or a result. Here is what you get when you click on a displacement:



And if you select the probe in the tree and click on the “New Chart and Table” icon you get:



No woop. But even if I want to just plot one value, I can now customize the look of the graph a bit. Take a look at the Details for the Chart:

Details of "Chart 3"

Definition

Outline Selection
1 Objects

Chart Controls

X Axis
Time

Plot Style
Both

Scale
Linear

Gridlines
None

Axis Labels

X-Axis

Y-Axis

Report

Content
Chart And Tabul...

Caption

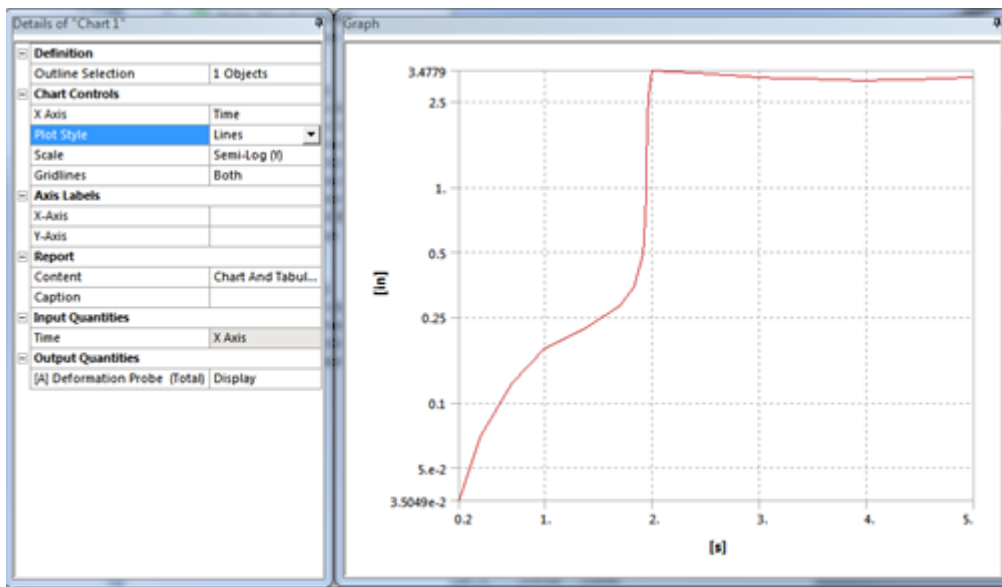
Input Quantities

Time
X Axis

Output Quantities

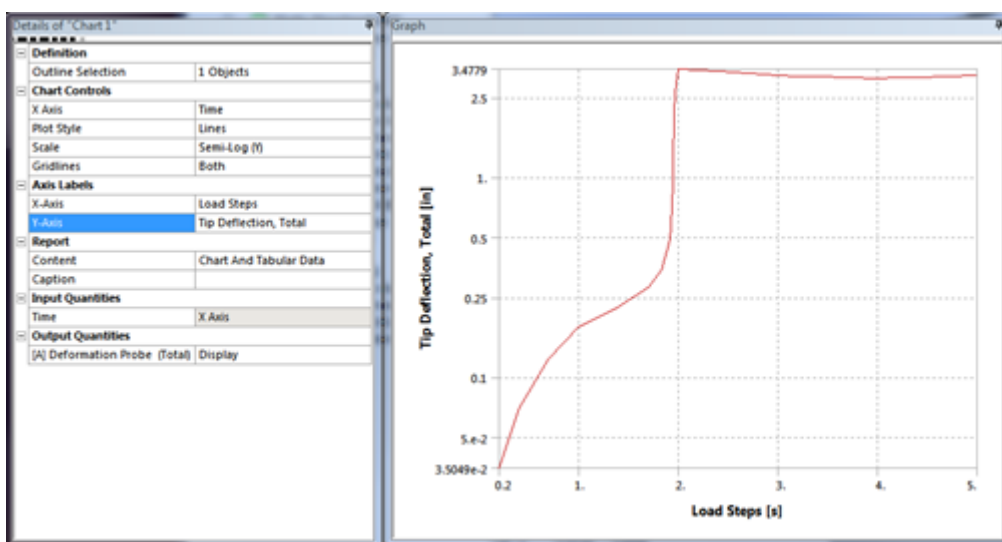
[A] Deformation Probe (Total)
Display

With the Chart Controls you can define what is shown on the X axis; if you want lines, points or both with Plot Style, log or linear scale, and if you want horizontal, vertical, neither, or both gridlines.

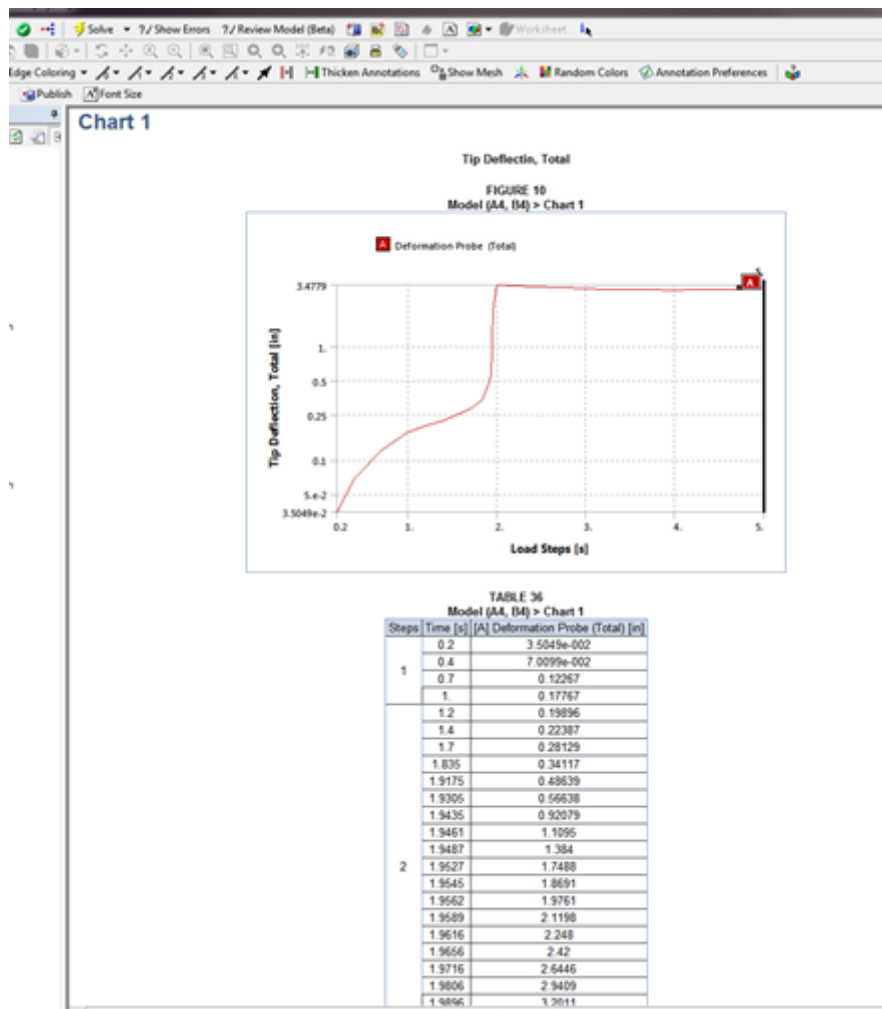


This is what it looks like if I turn on both gridlines and use a log scale for the Y Axis.

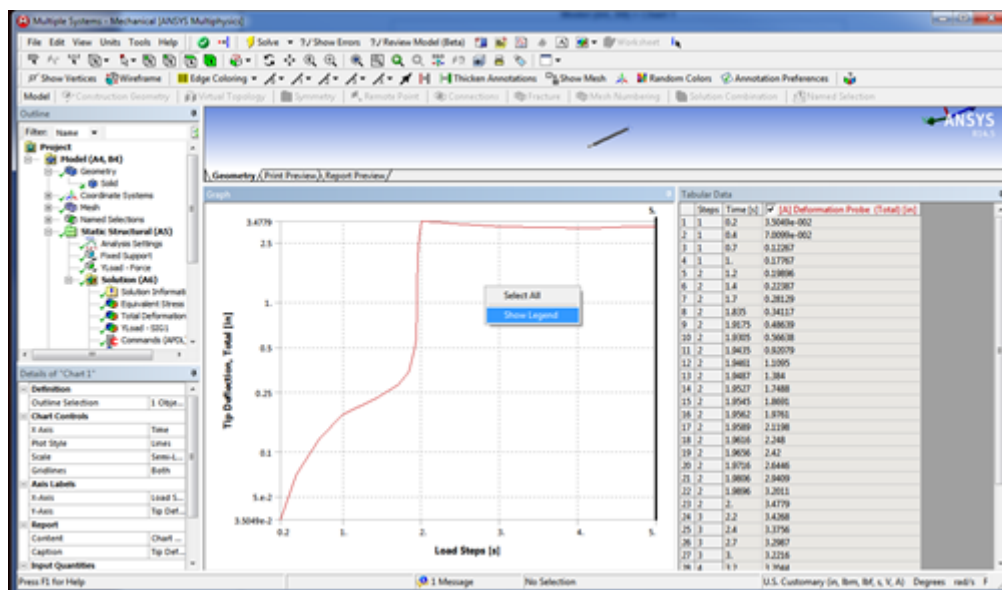
Next, we can add axis labels with "Axis Labels:"

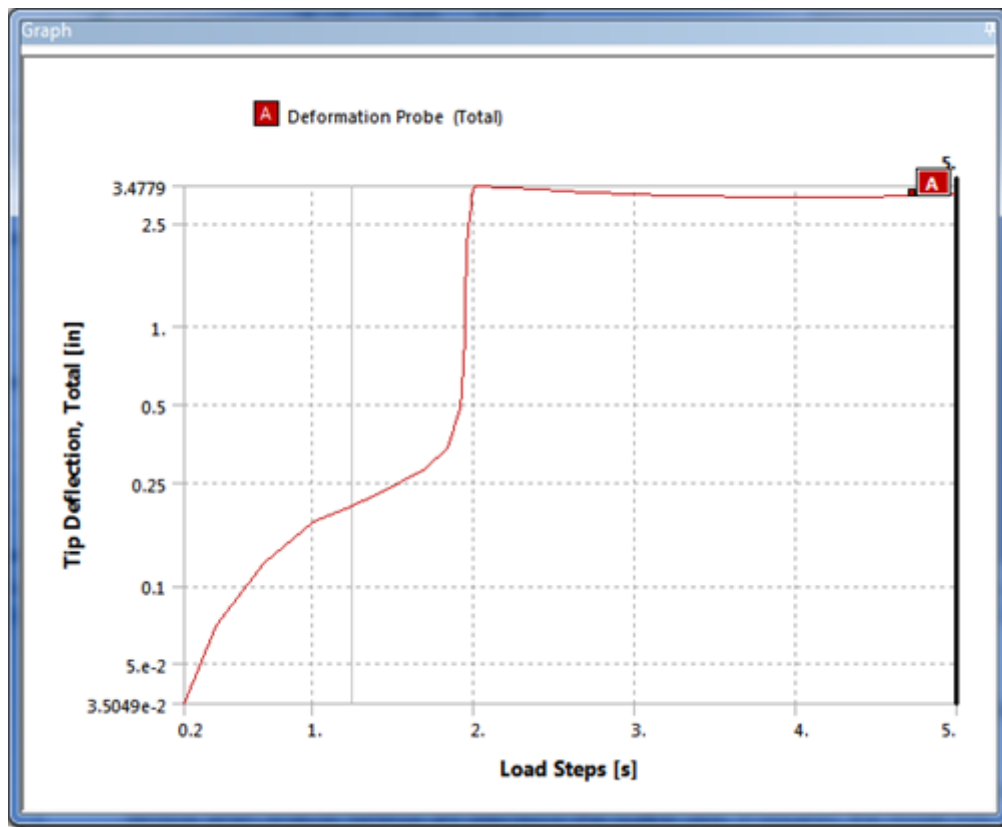


The "Report" Section tells the program what to do when a report is generated. By Default you get a table and a graph. But you can do either, both, or you can suppress it in the report. You can give the plot and/or table in the report a caption by filling in the Caption field. It comes out nice:

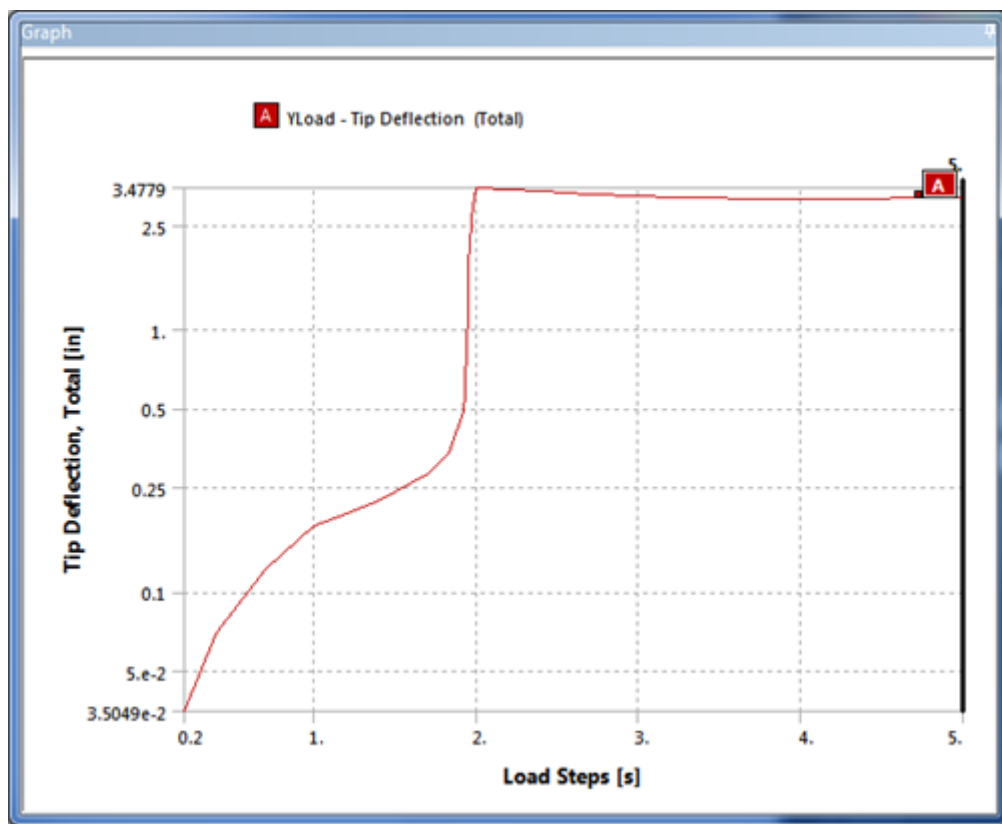


Note that it actually includes a legend in the report. If you want the legend when you are looking at a graph interactively, just Right Mouse Button on the graph and choose “Show Legend” to turn it on:

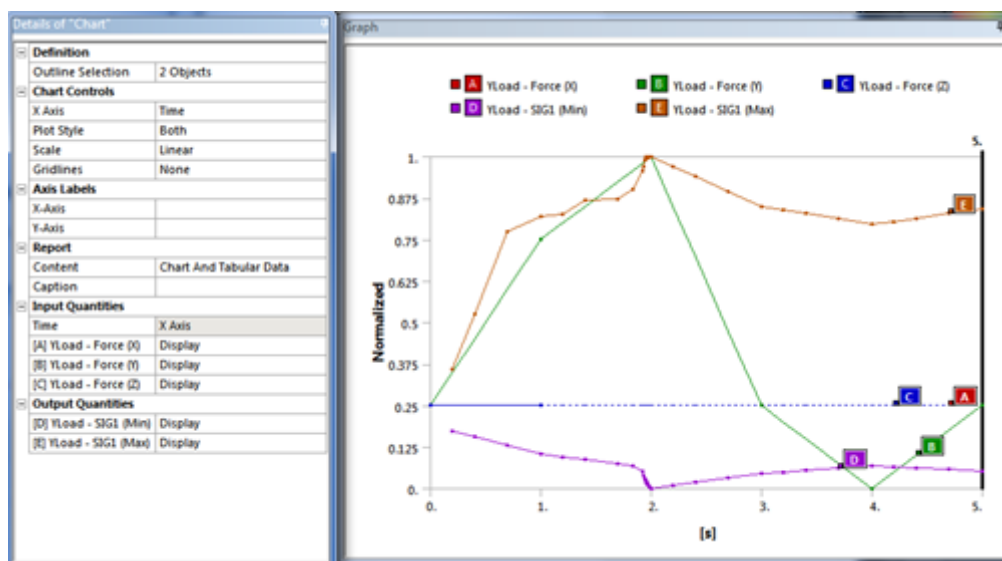




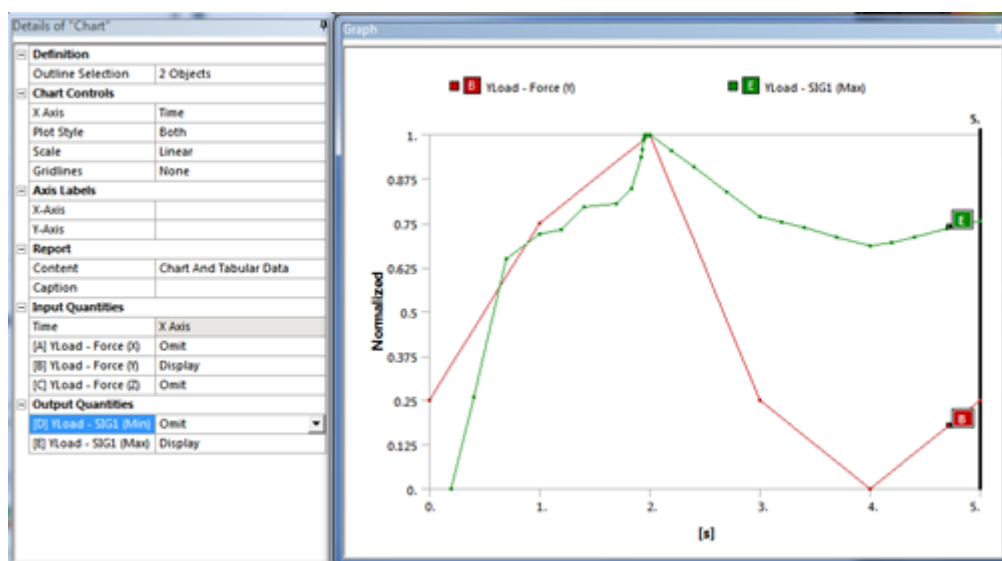
Note that the legend shows the name of the branch in the tree. That is not very informative. So I change it to something useful and now the legend is useful:



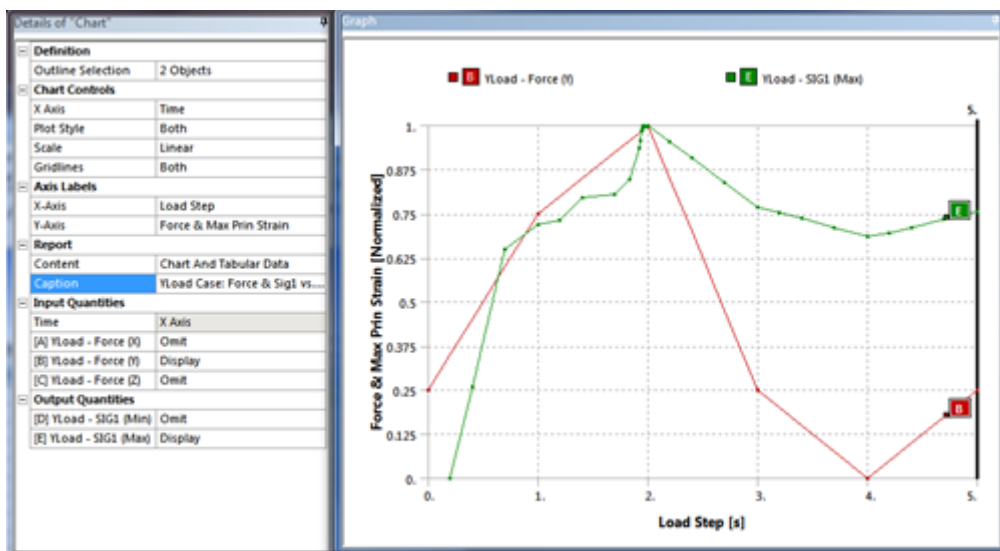
So even with a basic graph, we can do a lot. But the real power is when you want to look at more. Let's say I want to plot the force and the stress over time. I create a new chart with the icon then select the force and the stress results as my "Outline Selection"



I get a lot of stuff on my graph. That is because the program starts by plotting all the components for the load, and all max and min stress over time for the result. I simply change the ones I don't want from "Display" to "Omit." Then I get:



Much more useful. Note that it does not create two separate Y axis. Instead it normalizes the values between the min and max for each. This is not ideal, and hopefully in the future they will support multiple axis, but it still works for most cases when you want to compare things. Note that I renamed the branches in my tree so they show up in the legend correctly. Next I will add some labels and turn on gridlines.

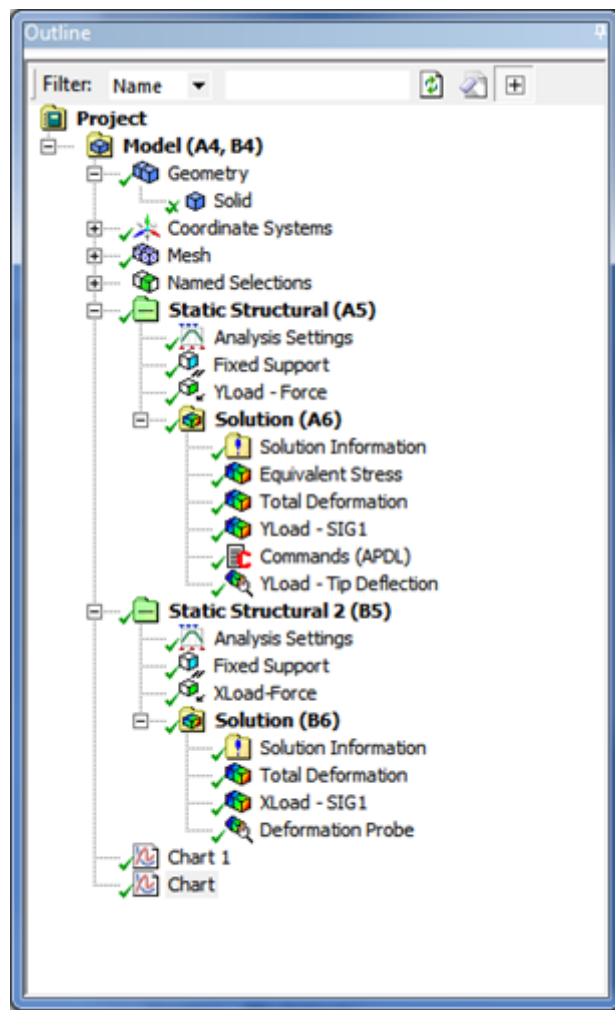


We have been neglecting the table. It also gets created:

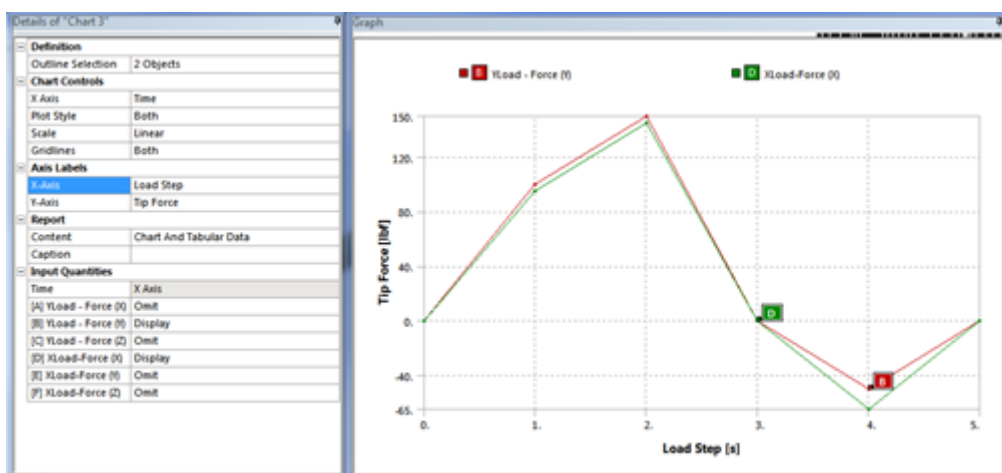
	Steps	Time [s]	<input checked="" type="checkbox"/> [B] YLoad - Force (Y) [lbf]	<input checked="" type="checkbox"/> [E] YLoad - SIG1 (Max) [psi]
1	1	0.	0.	
2	1	0.2	= 20.	10696
3	1	0.4	= 40.	21389
4	1	0.7	= 70.	37424
5	1	1.	100.	40289
6	2	1.2	= 110.	40783
7	2	1.4	= 120.	43349
8	2	1.7	= 135.	43726
9	2	1.835	= 141.75	45531
10	2	1.9175	= 145.88	49128
11	2	1.9305	= 146.53	50021
12	2	1.9435	= 147.18	51193
13	2	1.9461	= 147.31	51366
14	2	1.9487	= 147.44	51323
15	2	1.9527	= 147.64	51630
16	2	1.9545	= 147.72	51735
17	2	1.9562	= 147.81	51780
18	2	1.9589	= 147.94	51802
19	2	1.9616	= 148.08	51759
20	2	1.9656	= 148.28	51701
21	2	1.9716	= 148.58	51685
22	2	1.9806	= 149.03	51725
23	2	1.9896	= 149.48	51707
24	2	2.	150.	51801
25	3	2.2	= 120.	49894
26	3	2.4	= 90.	47988
27	3	2.7	= 45.	45131
28	3	3.	0.	42275
29	4	3.2	= -10.	41640
30	4	3.4	= -20.	40971
31	4	3.7	= -35.	39888
32	4	4.	= -50.	38903
33	5	4.2	= -40.	39266
34	5	4.4	= -30.	39898
35	5	4.7	= -15.	40846
36	5	5.	0.	41794

As with any table in ANSYS Mechanical, it can be exported to Excel. So if you find yourself grabbing data from multiple input or result tables and pasted them into Excel, make a Chart and Table item to grab all the data you want in one place, then export it once. To be honest, the quality of the graphs that are made are good enough for engineering, but maybe not good enough for a presentation. By making a Chart & Table of what you need, then exporting to Excel or some other graphing tool, you can still save a lot of time.

Next, let us look at plotting values from multiple simulations. If you look at the tree, you will notice that the charts are a child of the model, not the simulations. This signals that we can show data from the same model, but different simulations:



In our example I've simply made one with a tip force in the Y direction, and one with a tip force in the X direction. And I can show that by making a chart:



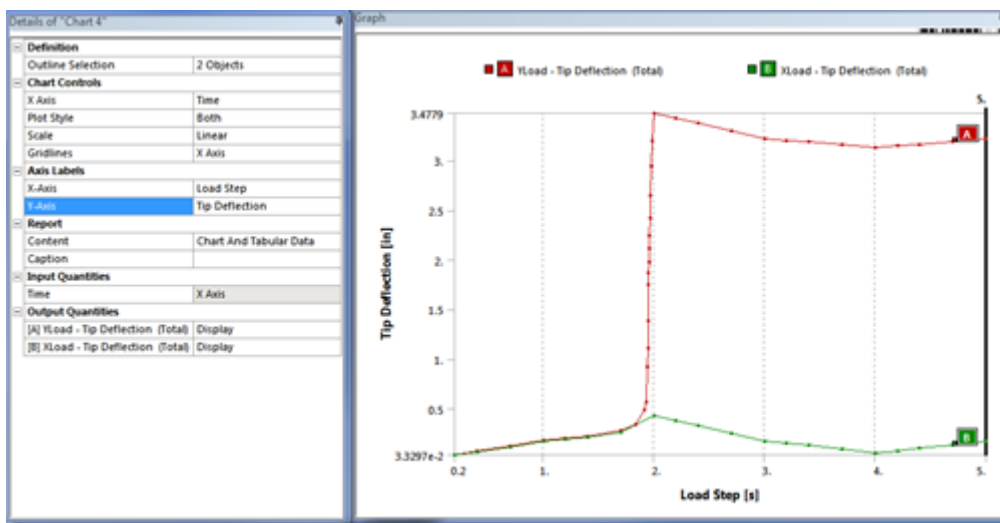
And I get a table:

Tabular Data					
	Steps	Time [s]	<input checked="" type="checkbox"/> [B] YLoad - Force (Y) [lbf]	<input checked="" type="checkbox"/> [D] XLoad-Force (X) [lbf]	
1	1	0.	0.	0.	
2	1	1.	100.	95.	
3	2	2.	150.	145.	
4	3	3.	0.	0.	
5	4	4.	-50.	-65.	
6	5	5.	0.	0.	

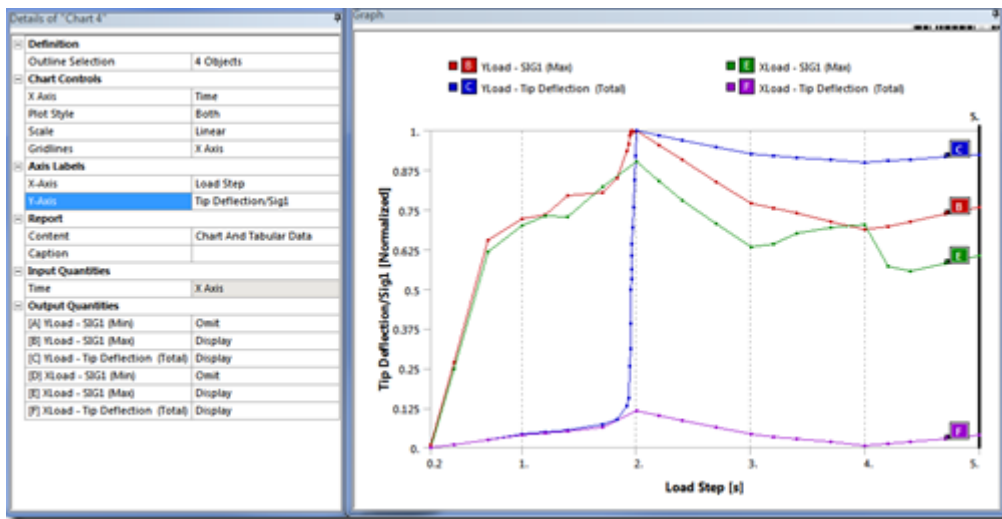
HINT: If you want to make a single table or chart that shows all your input loads over time, in a single simulation or across multiple simulations, this is the way to do it. If I add a third simulation where I vary the load in all three directions, I can capture all three cases in one table:

Steps	Time [s]	<input checked="" type="checkbox"/> [A] YLoad - Force (Y) [lbf]	<input checked="" type="checkbox"/> [B] YLoad - Force (Y) [lbf]	<input checked="" type="checkbox"/> [C] YLoad - Force (Y) [lbf]	<input checked="" type="checkbox"/> [D] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [E] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [F] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [G] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [H] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [I] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [J] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [K] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [L] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [M] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [N] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [O] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [P] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [Q] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [R] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [S] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [T] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [U] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [V] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [W] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [X] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [Y] XLoad-Force (X) [lbf]	<input checked="" type="checkbox"/> [Z] XLoad-Force (X) [lbf]	
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	1.	0.	100.	0.	0.	95.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3	2.	0.	150.	0.	0.	145.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
4	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	4.	0.	-50.	0.	0.	-45.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6	5.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

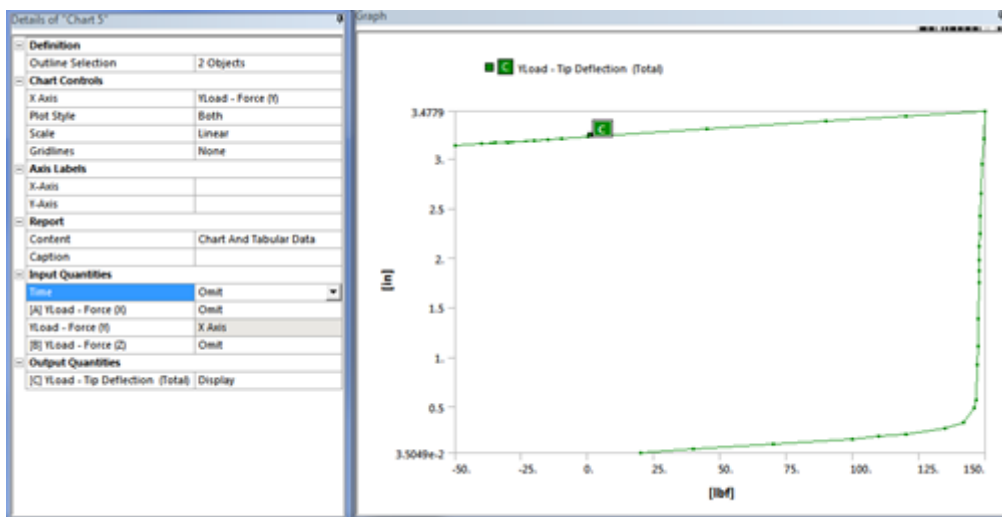
These examples show loads. Here is what it looks like if we review the deflection on the tip probe over time for two simulations:



Or mash it all up, and show stress and deflection for both cases:

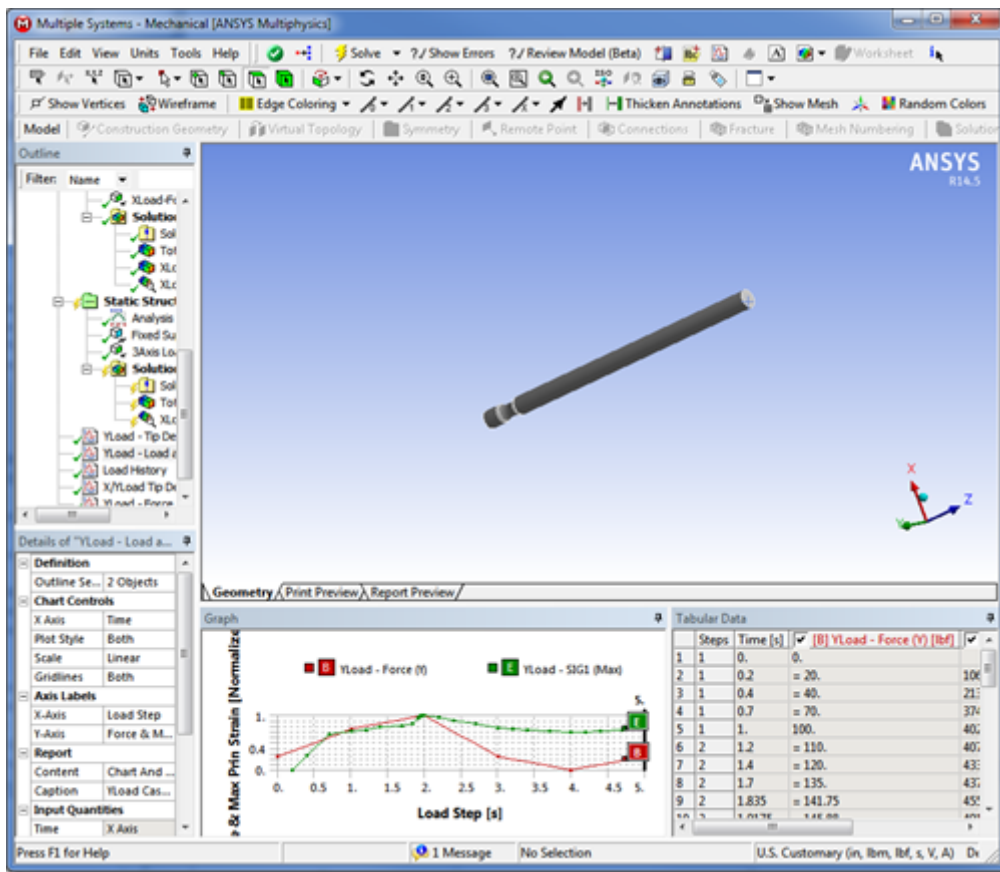


In every case so far we have used time (Load Step for static) as our X axis. But you can put any value you want on the X axis. Here is Force applied vs Tip Deflection:

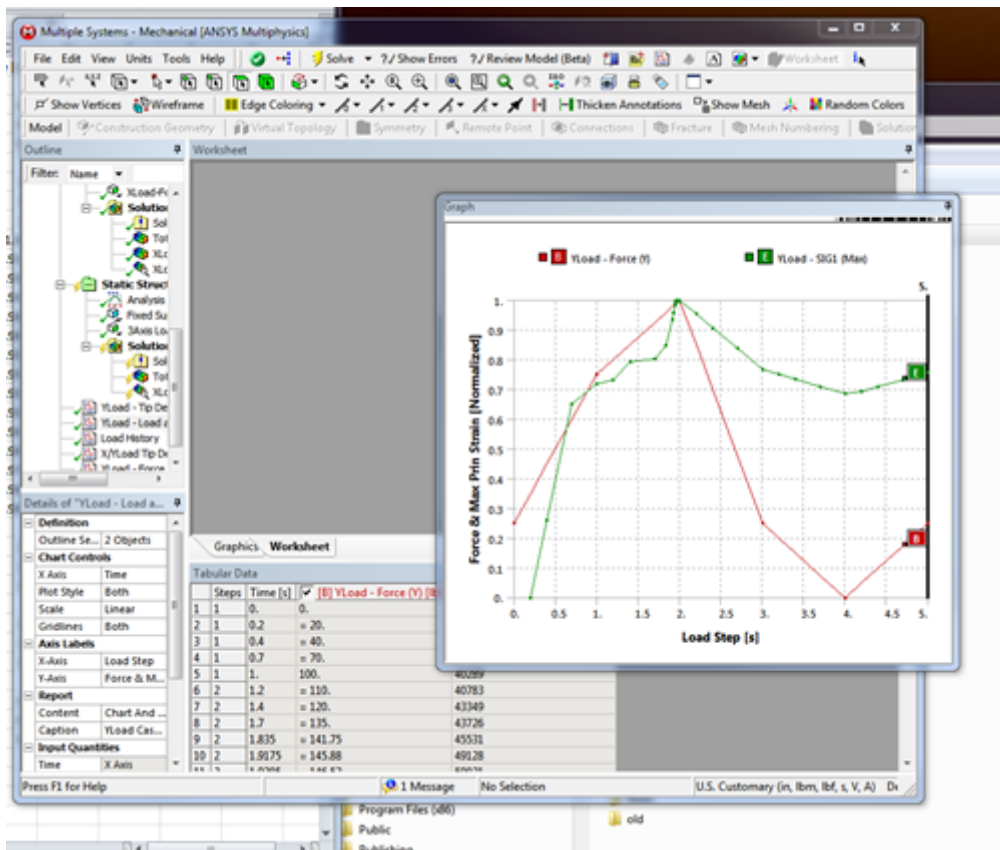


Make sure you turn off Time and loads you don't want to see. This is a great way to plot hysteresis effects.

You may notice the plots in this posting are nice and big and have a good aspect ratio. And your screen looks like this:



Every window in ANSYS Mechanical can be dragged out of the frame and positioned/sized however you want. So I pull off the Graph window by itself and resize it to the aspect ratio I want. Now when I want to save the image all I have to do is select that window and hit Alt-Print Screen. The image is now stored in the clipboard and I can paste it where I want.



To get the normal window configuration back, click View>Windows>Reset Layout.

As always, play with it to figure more out. I've included my simple test case in case you want to play with it first:

PADT-Focus-Chart-Table-2013_11_07.wbpz

Share this:



Like this:

Loading...

Related

The 10 Coolest New Features in R15 of ANSYS Mechanical

December 3, 2013

In "The Focus"

10 Useful New Features in ANSYS Mechanical 16.0

February 13, 2015

In "The Focus"

Solution Information:

Monitoring your Solves in ANSYS Mechanical

July 12, 2012

In "The Focus"

You must **log in** to post a comment.

< **Three Open Jobs at PADT – CFD Engineer, BusOps, QA Engineer**

PADT Part of “Made in Tempe” Exhibit at Tempe History Museum >

Contact PADT
1-800-293-PADT ☎
info@padtinc.com ✉

SEARCH

Search



LINKS

[Privacy](#) - [Terms](#)

[PADT Website](#)

[Contact PADT](#)

[PADTMarket.com](#)

[Manage PADT Subscriptions](#)

SUBSCRIBE TO OUR BLOG

Enter your email address to subscribe to this blog and receive notifications of new posts by email.

Join 1,804 other subscribers

Subscribe

UPCOMING EVENTS

01/19/2022 - 01/21/2022

[Arizona Photonics Days](#)

04/04/2022 - 04/07/2022

[37th Space Symposium](#)

[Arizona Space Industry Booth](#)

04/12/2022 - 04/14/2022

[D&M West](#) | [MD&M West](#)

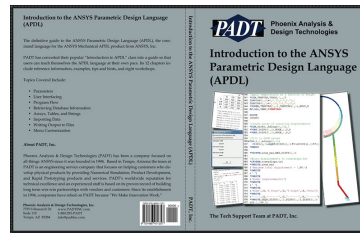
3D PRINTING GLOSSARY



3D PRINTING GLOSSARY

A RESOURCE FOR
ADDITIVE MANUFACTURING

INTRODUCTION TO THE ANSYS PARAMETRIC DESIGN LANGUAGE



Learn APDL with this workshop based book written by PADT's Technical Support Team. The new and improved Second Edition contains additional chapters on APDL Math and APDL in ANSYS Mechanical.

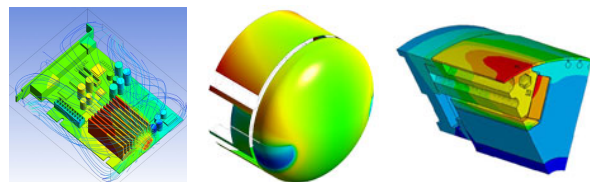
Now available on Kindle as well as paperback.

More...

SIMULATION SERVICES

PADT's simulation engineers are true experts in virtual prototyping. Trust the people you come to for ANSYS expertise to handle your simulation outsourcing needs.

Structural, Thermal, Fluid, Electromagnetic, and Systems.



LOOKING FOR ANSYS TRAINING?



Let the people who write “The Focus” train you and your team. Check out our [schedule](#) or [contact us](#) to set up a class at your place or something custom.

PODCAST: ALL THINGS ANSYS



ANSYS ACADEMIC PROGRAM



RSS SUBSCRIBE:



RECENT POSTS:

Surprise – 2021 Turned out to Be a Lot Like 2020

All Things Ansys 102: Electronics Reliability Updates in Ansys 2021 R2

Simulating an Electro-Permanent Magnet (EPM) using Ansys Maxwell

Ansys Pro – Premium – Enterprise Electronics Licensing Adjustments

All Things Ansys 101: Additive & Structural Optimization Updates in Ansys 2021 R2

CATEGORIES

Additive Manufacturing

Ansys

ANSYS Discovery

ANSYS Energy Innovation Campaign

ANSYS R 18

Carbon

Education

Events

Flownex

Fun

Getting To Know PADT

News

Nimbix

PADT Medical

PADT Startup Spotlight

Podcast

Product Development

Publications

Startups

Stratasys

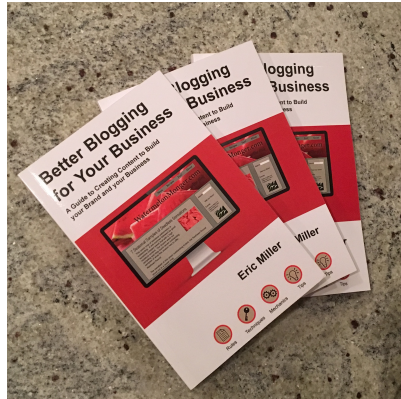
Stratasys Marketing

The Focus

Uncategorized

Webinar

THINKING ABOUT A BLOG FOR YOUR COMPANY?



Where do you start? How do you keep it going? Where do I get ideas for posts? Should I use humor?

These questions and many others are answered in the book that was inspired by the success of PADT's blog:

Better Blogging for your Business

Available now as a Kindle book or softcover on Amazon.

PADT EMAIL

Manage how PADT Emails You

Want to receive Emails from PADT? Please select any of the basic topics below to tell us what you are interested in. We promise to keep it simple sharing news, opportunities, and useful information. You can come back and change your settings whenever you need to.

* Email

State/Province

Company

*** Email Lists**

- ☐ PADT Additive & Advanced Manufacturing Email List
- ☐ PADT General Information Email List
- ☐ PADT Product Development and Testing Email List
- ☐ PADT Simulation Email List

By submitting this form, you are consenting to receive marketing emails from: Phoenix Analysis and Design Technologies, 7755 S. Research Dr., Suite 110, Tempe, AZ, 85284, US, <http://www.padtinc.com>. You can revoke your consent to receive emails at any time by using the SafeUnsubscribe® link, found at the bottom of every email. **Emails are serviced by Constant Contact.**

Sign Up!

Contact PADT
1-800-293-PADT 
info@padtinc.com 

SEARCH

Search

LINKS

[PADT Website](#)

[Contact PADT](#)

[PADTMarket.com](#)

[Manage PADT Subscriptions](#)

ANSYS STARTUP PROGRAM

LOOKING FOR ANSYS TRAINING?



Let the people who write "The Focus" train you and your team. Check out our [schedule](#) or [contact us](#) to set up a class at your place or something custom.

TRYING TO FIND A COMPUTER BUILT FOR SIMULATION?

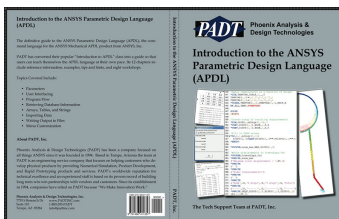


Workstations,
Servers, and
Clusters
designed by
PADT

specifically for
simulation users.

[Learn More](#)

INTRODUCTION TO THE ANSYS PARAMETRIC DESIGN LANGUAGE



Learn APDL with this workshop based book written by PADT's Technical Support Team. The new and improved Second Edition contains additional chapters on APDL Math and APDL in ANSYS Mechanical.

Now available on Kindle as well as paperback

[More...](#)

RECENT POSTS

Surprise – 2021 Turned out to Be a Lot Like 2020

All Things Ansys 102: Electronics Reliability Updates in Ansys 2021 R2

Simulating an Electro-Permanent Magnet (EPM) using Ansys Maxwell

Ansys Pro – Premium – Enterprise Electronics Licensing Adjustments

All Things Ansys 101: Additive & Structural Optimization Updates in Ansys 2021 R2

CATEGORIES

Additive Manufacturing

Ansys

ANSYS Discovery

ANSYS Energy Innovation Campaign

ANSYS R 18

Carbon

Education

Events

Flownex

Fun

Getting To Know PADT

News

Nimbix

PADT Medical

PADT Startup Spotlight

Podcast

Product Development

Publications

Startups

Stratasys

Stratasys Marketing

The Focus

Uncategorized

Webinar

 Connect with PADT

© 2021 [PADT, Inc. – The Blog](#) • [Privacy Policy for the PADT Blog](#) • [Powered by WordPress](#) • Theme: [Gillian](#)



☺