

Plotting link hysteresis

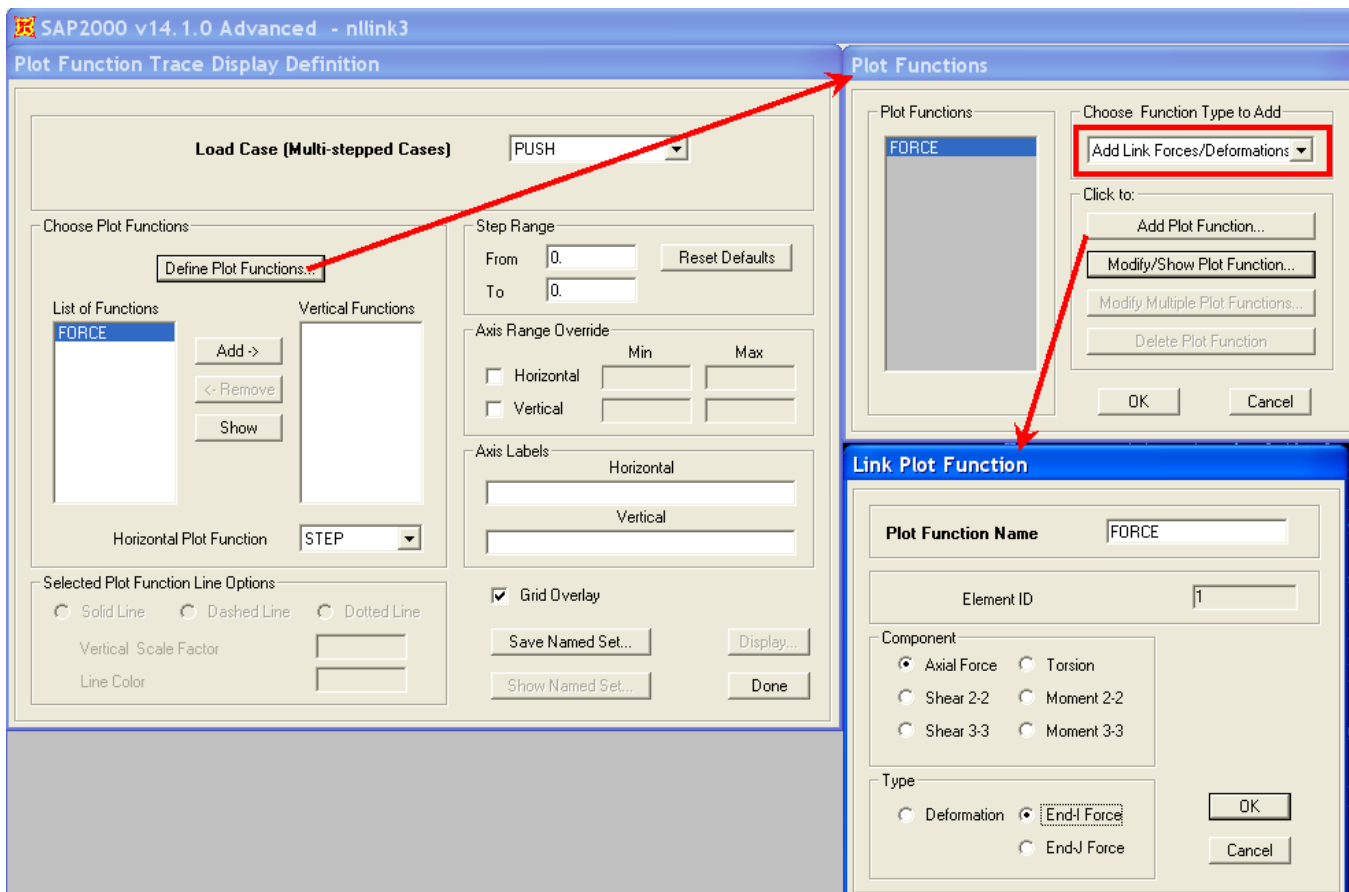
 This page describes how to **plot link hysteresis** using [SAP2000](#).

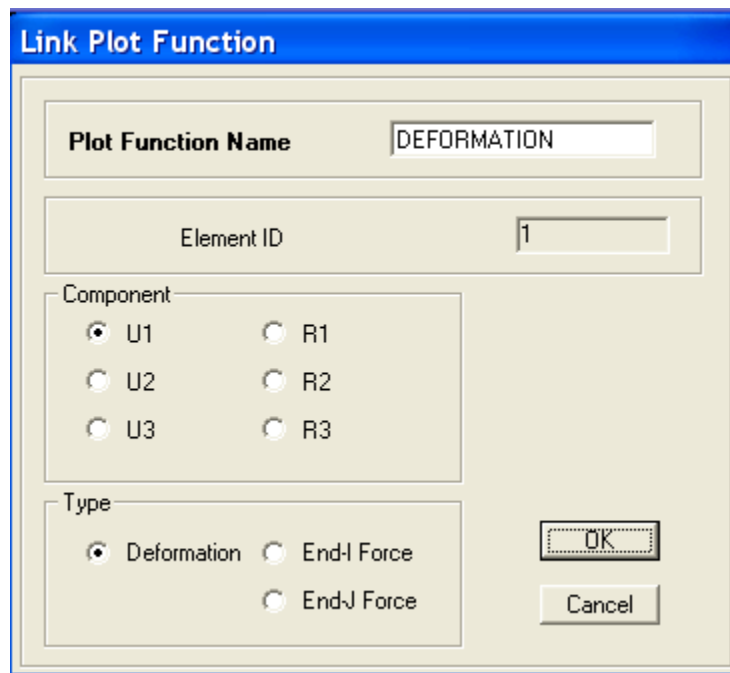
Similar functionality is available to [CSiBridge](#) in that the plot menu is available through Home > Display > More > Show Plot Functions.

Users should first run [nonlinear](#) analysis to generate the data necessary for **plotting link hysteresis**.

Once analysis is complete, users should define two plot functions, one for [link](#) deformation, and one for link force. These plot functions are generated as follows:

- Select Display > Show Plot Functions.
- On the Plot Function Trace Display Definition menu, select Define Plot Functions.
- Select Add Link Forces/Deformations > Add Plot Function.
- Specify a link label, along with the desired component and type of plot function.
- Select OK to save the definition.
- Select the defined plot function, then select Modify/Show Plot Function to assign such custom names as DEFORMATION for link deformation and FORCE for link force, as shown in Figure 1:





The image shows a software dialog box titled "Link Plot Function". It has a blue header bar with the title in white text. The main area is light beige. At the top, there is a label "Plot Function Name" followed by a text box containing the word "DEFORMATION". Below this is a label "Element ID" followed by a text box containing the number "1". Underneath, there is a section titled "Component" which contains two columns of radio buttons. The first column has three buttons labeled "U1", "U2", and "U3", with "U1" being selected. The second column has three buttons labeled "R1", "R2", and "R3", none of which are selected. Below the "Component" section is a section titled "Type" which contains three radio buttons: "Deformation" (selected), "End-I Force", and "End-J Force". To the right of the "Type" section are two buttons: "OK" and "Cancel".

Link Plot Function

Plot Function Name DEFORMATION

Element ID 1

Component

☒ U1 ☐ R1

☐ U2 ☐ R2

☐ U3 ☐ R3

Type

☒ Deformation ☐ End-I Force

☐ End-J Force

OK

Cancel

Figure 1 - Define plot functions

- Select deformation as the horizontal plot function and force as the vertical plot function, as shown in Figure 2:

SAP2000 v14.1.0 Advanced - nllink3

Plot Function Trace Display Definition

Load Case (Multi-stepped Cases) PUSH

Choose Plot Functions

Define Plot Functions...

List of Functions

DEFORMATION

Add ->

<- Remove

Show

Vertical Functions

FORCE

Horizontal Plot Function DEFORMATIC

Step Range

From 0.

To 0.

Reset Defaults

Axis Range Override

☐ Horizontal

☐ Vertical

Min

Max

Axis Labels

Horizontal

Vertical

Selected Plot Function Line Options

☐ Solid Line ☐ Dashed Line ☐ Dotted Line

Vertical Scale Factor

Line Color

☒ Grid Overlay

Save Named Set...

Show Named Set...

Display...

Done

Figure 2 - Define performance measures

- Finally, select Display to display the hysteresis curve, as shown in Figure 3:

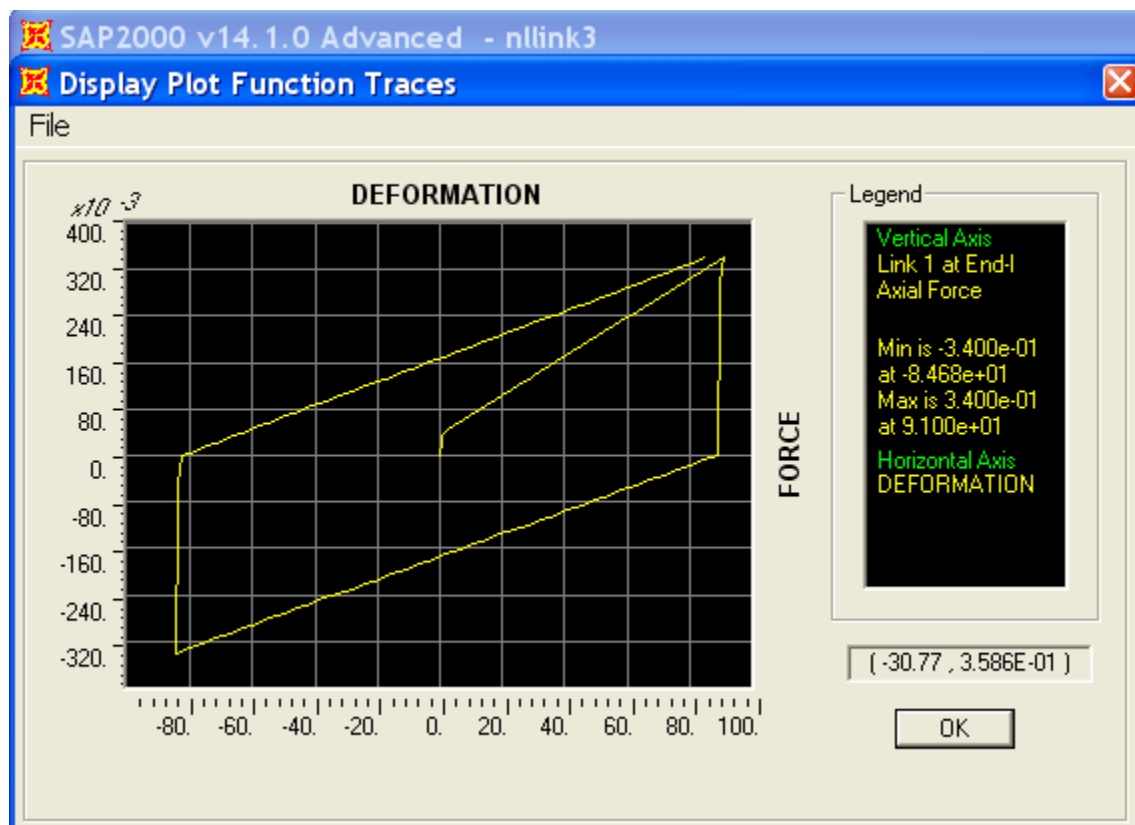


Figure 3 - Hysteretic curve