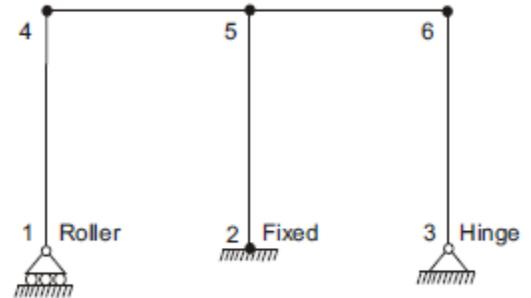


# Frame

Please see the [joint](#) section for information related to the nodes at either end of a **frame** object.

**Frame** objects, used to model beams, columns, braces, and truss elements in planar and 3D systems, are straight lines which connect two nodes. Biaxial bending, torsion, axial deformation, and biaxial shear are all accounted for in the beam-column formulation (Bathe and Wilson, 1976) which characterizes frame behavior. [Material nonlinearity](#) may be modeled through the assignment of frame [hinges](#). Multiple straight segments may be used to model curved members, and features are available for non-prismatic members. The *CSI Analysis Reference Manual* (Chapter VII: The Frame Element) provides additional information on frame objects.



## Articles

## Tutorials

Title	Description	Program
<a href="#">Cold-formed steel truss</a>	This tutorial demonstrates the modeling of a cold-formed steel truss system.	SAP2000
<a href="#">Hinge first steps (CSiBridge)</a>	Basic introduction to hinge application in CSiBridge.	CSiBridge
<a href="#">Hinge first steps (SAP2000)</a>	Basic introduction to hinge application in SAP2000.	SAP2000
<a href="#">Import frame properties from shape libraries</a>	Guidelines for importing frame properties from shape libraries.	CSiBridge
<a href="#">Modeling a pin connection between crossing members</a>	Modify joints and apply constraints such that a pin connection allows crossing members to translate freely.	SAP2000
<a href="#">Radial point load</a>	Application of point loads in the radial direction using the Advanced Joint Coordinate Axes feature.	SAP2000
<a href="#">Reinforced-concrete column and beam design</a>	Design reinforced-concrete columns and beams while considering combined performance measures and interaction-surface output.	SAP2000
<a href="#">Steel-frame pipe rack</a>	A detailed and extensive procedure which describes the modeling, analysis, and design of a 3D steel-frame pipe rack system.	SAP2000
<a href="#">Vibrating-machinery steel skid on piles</a>	This tutorial demonstrates the modeling of vibrating machinery and its connection to a steel-skid structural system.	SAP2000

## Test Problems

Title	Description	Program
<a href="#">Align solid and hollow sections</a>	Model relative positive position for frame sections which have identical outlines, but different center-of-gravity locations due to one section being hollow.	SAP2000
<a href="#">Effect of insertion point on beam reactions</a>	How insertion point affects horizontal reactions and flexural response of a simply supported beam.	SAP2000
<a href="#">End offsets</a>	Demonstration of end offsets applied to a two-span continuous beam.	SAP2000
<a href="#">Frame to shell connections</a>	This tutorial describes the application of connections between frame and shell elements.	SAP2000
<a href="#">Hinge response when yield point changes</a>	Behavior of a concentrated plastic hinge when the loading applied to a nonlinear frame object causes the yield point of the interaction surface to change position.	SAP2000
<a href="#">Insertion point and transform stiffness</a>	3D demonstration of insertion-point, end-offset, and transform-stiffness application.	SAP2000
<a href="#">Partial end releases</a>	Hand calculations present the following SAP2000 features: fixed conditions, full releases, partial releases, rotational-spring supports, and panel zones.	SAP2000
<a href="#">Temperature load vs. insertion point</a>	Given temperature loading applied to a fixed-fixed beam with variable insertion point (centroid and top-center), theoretical solution is compared to that from a SAP2000 model.	SAP2000