Joint DOF

Modeling Recommendation

For any 3D structure, we recommend enabling all six degrees-of-freedom (DOF) at each joint location. Rotational DOF may be removed only when an object does not have rotational stiffness, as is the case with cables, solids, and frame elements with all end moments released to simulate a truss structure.

What is the difference between Space Frame and Space Truss?

Answer: Options available under Analysis Options > Fast DOF include Space Frame and Space Truss. Their differences are as follows:

- Members in a **space frame** are rigidly connected such that axial, shear, and bending forces resist loading. Further, loading may either be applied to joints or distributed along members. Since space-frame joints may translate or rotate, all DOF (UX, UY, UZ, RX, RY, and RZ) must be available for analysis.

- Members in a **space truss** are pinned at their ends, resisting load only through axial response. Because space-truss members are released from bending and shear, loading may only be applied to joints. Translational DOF (UX, UY, and UZ) are sufficient for analysis since rotational-stiffness components are set to zero.

It is best to use the space-frame option since a space truss will restrain rotation and artificially support the structure if all moments are not released.

See Also

- Truss article