

The following rod model has loads acting on rigid connectors C and D, as shown. The material in all sections of the rod have the same Young's modulus E . The cross-sectional area of the tapered sections varies linearly between points B and D.

- Draw a free body diagram of the complete rod (FBD).
- Write down the elemental stiffnesses k_1 , k_2 and k_3 for the rod.
- Form the global stiffness matrix $[K]$ from the (2x2) elemental stiffness matrices.
- Form the force vector $\{F\}$ for the rod based on your FBD above.
- Enforce the boundary conditions on the stiffness matrix and the force vector.
- Solve for the displacements of connectors C and D.

