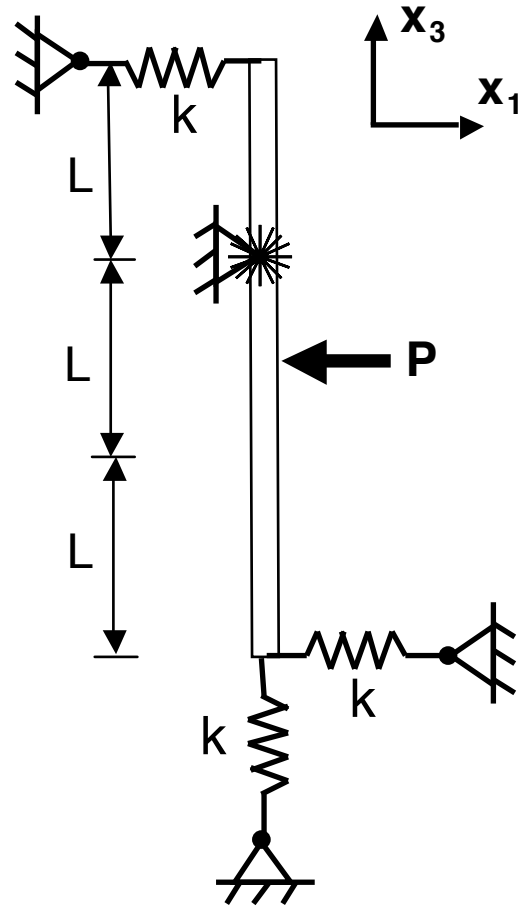


M6.1 (15 points) A rigid bar of length $3L$ is supported by four springs as shown. The three springs at the two ends of the bar are of the linear type and each have the a spring constant of k . The spring at the one-third point along the bar is of the torsional type and requires a moment of the same sense to the angle of rotation for displacement giving a constitutive relation of: $M = k_T \theta$, where k_T is the torsional spring constant. This is in addition to any reaction(s) due to the pin support at that point. The bar is loaded at the midpoint by a load of magnitude P in the negative x_1 - direction.



- Draw the free body diagram(s) for this situation (Consider the overall system and any appropriate subsystems).
- Determine whether this structural configuration is statically determinate or statically indeterminate and clearly explain your reasoning.
- Determine the reaction forces, the deflection of each spring, and the overall deflection of the bar.