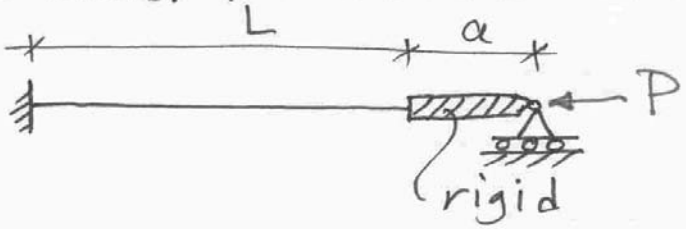
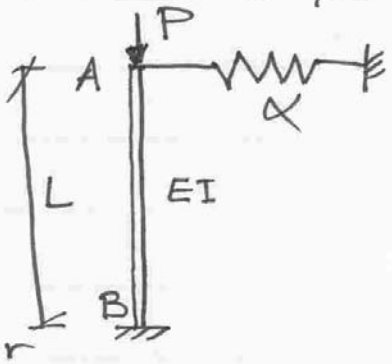
Homework #4

I) An ideal column is fixed at on end and fixed to a rigid bar of length a at the other end. The second end of the rigid bar is pinned on roller. Find the critical load condition and discuss the extreme cases. ($a \to 0$ and $a \to \infty$).



II) The vertical bar AB is supported by an extentional spring of stiffness α at A. Explain what is meant by the critical value of such a spring stiffness and find an expression for it when the lower end B of the bar is pinned.

Suppose that the elastic bar is built in at B. Show that there is no critical spring stiffness for this case.



III)

The horizontal beam AB is fixed at both ends. If the temperature of the beam is uniformly raised by ΔT from the stress-free condition. Find the critical loading if the coefficient of linear thermal expansion is α.