**Homework H.5.M**

Given: Particle A, of mass m, is able to slide on a smooth homogeneous bar of length L and mass m. The bar is pinned to ground at end O and particle B (of mass m) is rigidly attached to the other end. The bar is given an initial rotation rate of ω_1 when the A is at the midpoint of the bar, after which A slides outward on the bar. Eventually particle A impacts particle B, an impact having a coefficient of restitution of e.

Find: Determine the velocity of A immediately after impact. Express your answer in terms of its R-ϕ components.
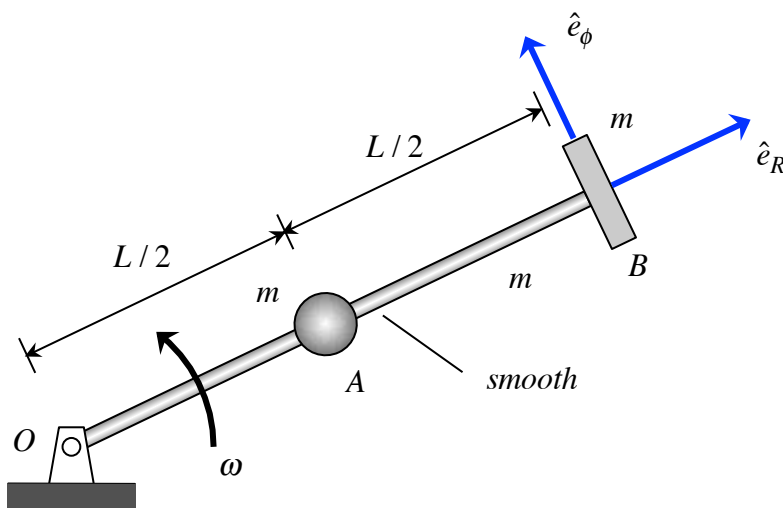
HORIZONTAL plane

Use the following parameters in your analysis: $\omega_1 = 5$ rad/s, $e = 0.8$, $m = 10$ kg and $L = 0.5$ m.