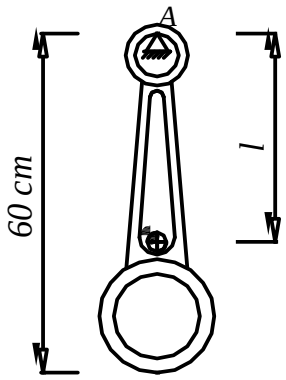
College of Maritime Engineering and Marine Sciences

Ship Vibrations

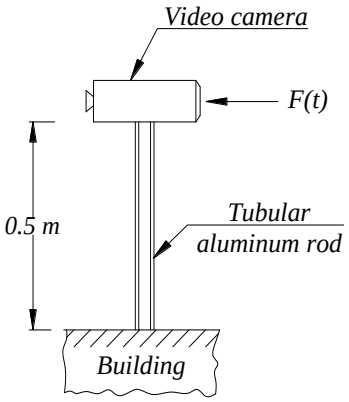
First Evaluation – Oscillation 1 dof **July 5th, 2019**

Student: .....

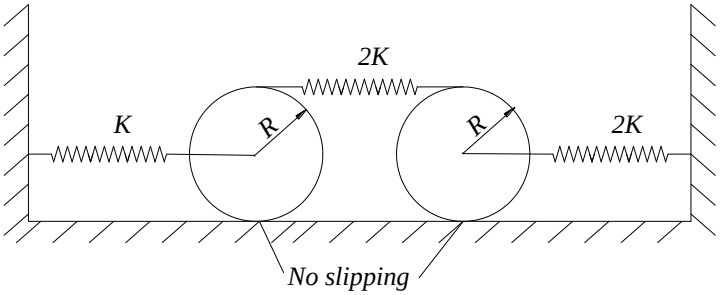
1.- The position of the center of mass and the mass moment of inertia of a connecting rod are to be estimated applying a simple process; mass of the rod is 2 kg. When the rod is pinned at an upper point A, the frequency os oscillation is 20 rad/sec. When a 250 gr mass is added to the free end, the system`s natural frequency is observed as 10 rad/s. Determine the location of the center of mass, distance *l*. (30)



2.- A video camera, of mass 2.0 kg, is mounted on the top of the new SiMar Naval engineering laboratory for surveillance. The video camera is fixed at one end of a tubular aluminum rod whose other end is fixed to the building as shown in attached figure. The summer wind-induced force acting on the video camera, with $F(t) = 25e^{i75.4t}, [N]$. Determine the cross-sectional dimensions of the aluminum tube if the maximum amplitude of vibration of the video camera is to be limited to 5 mm. (35)



3.- Two identical disks with mass *M* and radius *R* roll without slip on a horizontal surface. They are connected to vertical walls, and between them with three springs as shown in the figure. Deduce the equations of motions of the system as functions of the mentioned parameters. (35)



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I certify that during this exam I have complied with Code of Ethics of our university.

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