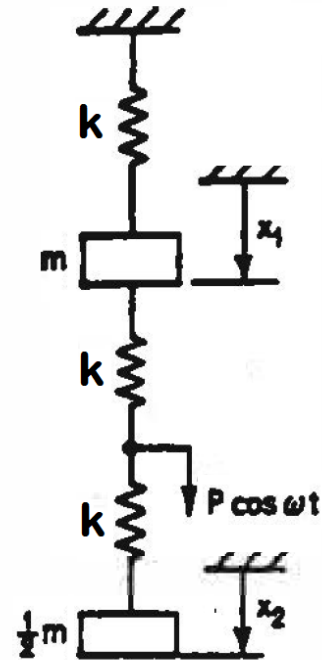


MECH 463 -- Tutorial 7

- Two masses, m and $\frac{1}{2}m$ are suspended from a fixed point by three massless springs, each of stiffness s . The system is excited by a force $P \cos(\omega t)$ acting at the junction of the two lower springs. Derive the equations of motion, and determine the steady state response of the system. Explain why the steady state response appears to indicate that there is only one natural frequency for this 2-DOF system.

Hint: Define x_3 at the junction of the two lower springs, draw appropriate free body diagrams and then eliminate x_3 from the resulting equations.



- A very idealized model of an automobile consists of a uniform slender rod of mass m and length L . The rod is supported at its quarter points by two springs, each of stiffness k . A force $f(t) = F \cos(\omega t)$ is applied at one end of the rod. Derive an expression for the vibrational displacement at that point. (Hint: The centroidal moment of inertia of a slender rod is $J = mL^2/12$)

