

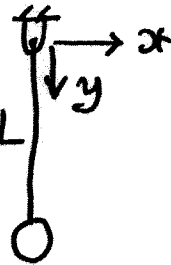
ASSIGNMENT 1 : SOLUTIONS

Q1 The minimum number of independent co-ordinates Required to Completely Specify the motion of a mechanical system are the number of degrees of freedom of that system.

Constraints reduce the number of co-ordinates. Constraints usually implies that Certain co-ordinates are not independent, but, related.

ex:- SIMPLE PENDULUM:

(x, y) co-ordinates locating the mass are NOT INDEPENDENT!



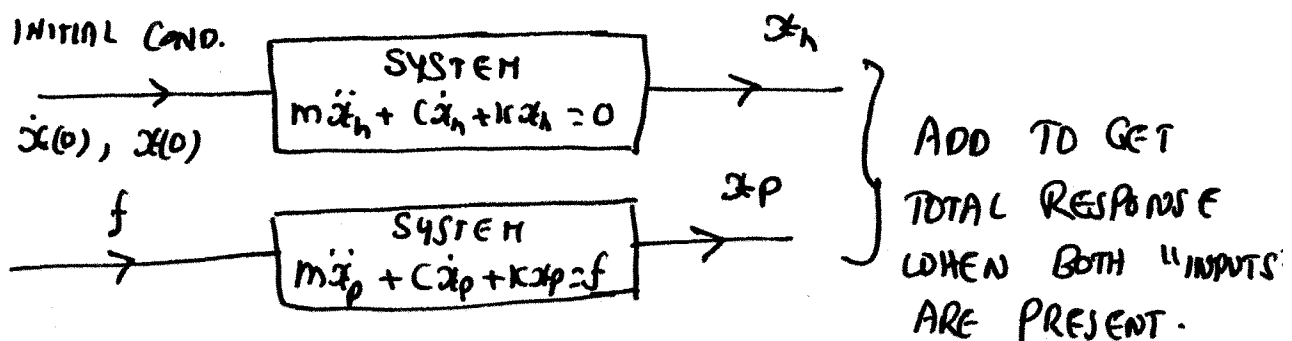
$$\sqrt{x^2 + y^2} = L$$

Q2 RESPONSE TO INITIAL CONDITIONS: $m\ddot{x}_h + c\dot{x}_h + kx_h = 0$ — (1)

RESPONSE TO FORCING FUNCTION: $m\ddot{x}_p + c\dot{x}_p + kx_p = f$ — (2)

PRINCIPLE OF SUPERPOSITION } : $m(\ddot{x}_h + \ddot{x}_p) + c(\dot{x}_h + \dot{x}_p) + k(x_h + x_p) = 0 + f$
 INITIAL CONDITIONS + FORCING
 (1) + (2)

WRITING $x = x_h + x_p$, $m\ddot{x} + c\dot{x} + kx = f$



Q3

PROBLEM 1.5. FROM COURSE TEXT

