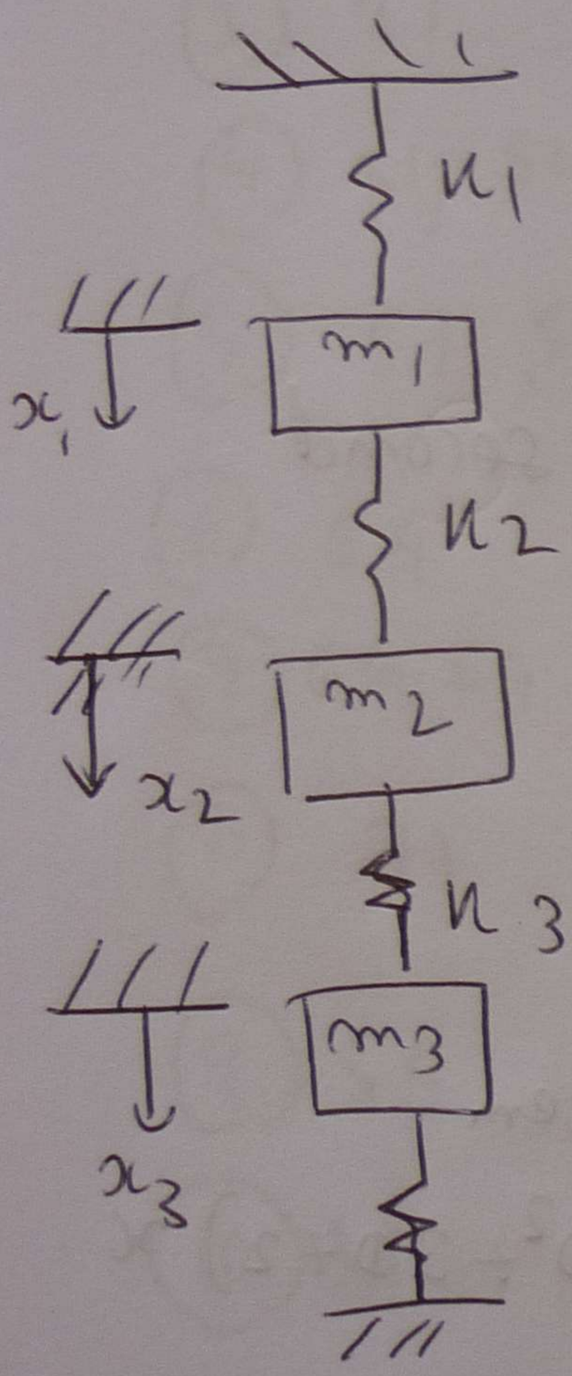
ME

BAE 311 vibration & control

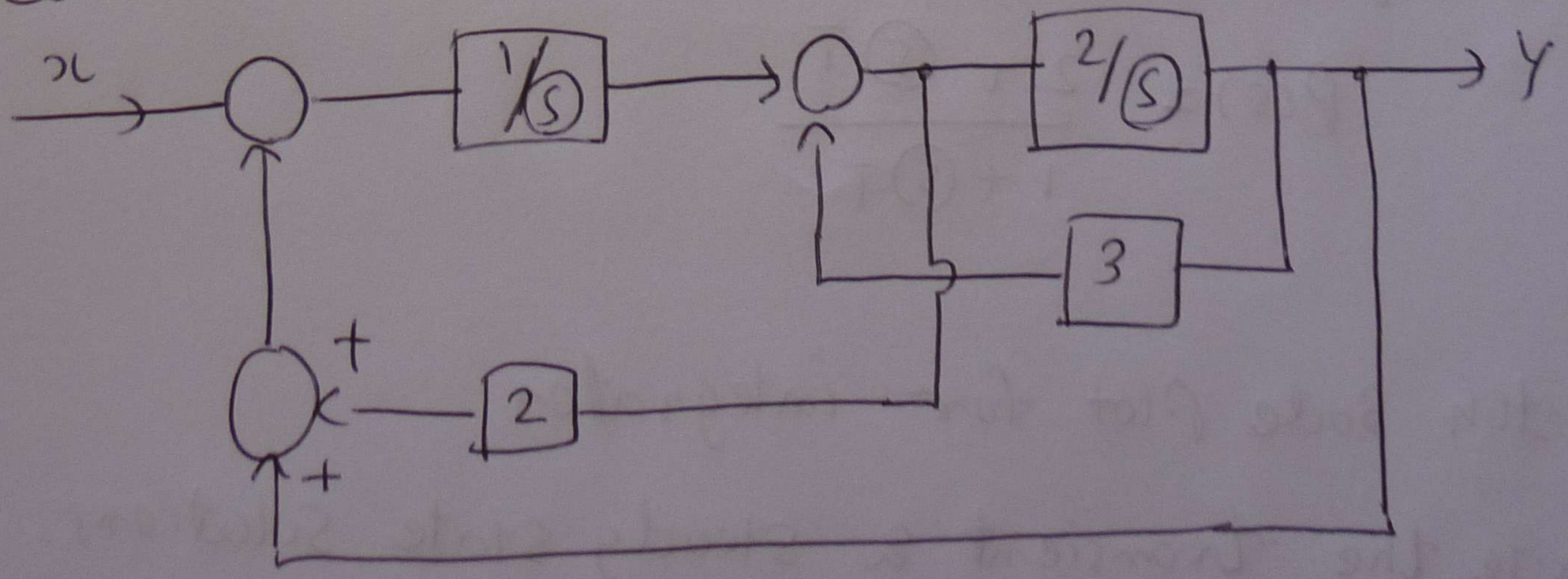
Test

(1) (a) Determine the equation of motion of the system shown by Newton's method. If $K_1 = K_2 = K_3 = K$ $m_1 = m_2 = m_3 = m$, Find the natural frequencies of the system



(b) In above Problem, also find the natural frequencies

(2) modify the given control Loop.



(3) Effect a linear approximation for the equation $y = x^2$ for values of x in the neighborhood of 10 and find the error when using this approxima for $x = 11$

(4) sketch the control models for the followings
(a) spring mass damper system
(b) Thermal system
(c) Hydraulic servo motor

(5) sketch the polar plot for the following second order system

$$G(s) = \frac{\omega_n^2}{s^2 + 2\zeta\omega_n s + \omega_n^2}$$

(6) Describe Routh stability criterion

(7) check the stability of the given system
$(D^4 + 3D^3 + 6D^2 + 9D + 12)y = (D^3 + 5D^2 + 3D + 2)x$

(8) sketch polar plot for the followings

$$P(s) = \frac{2 + (5)T}{1 + (5)T}$$

(9) sketch Bode plot for integrator

(10) write the transient & steady state solutions