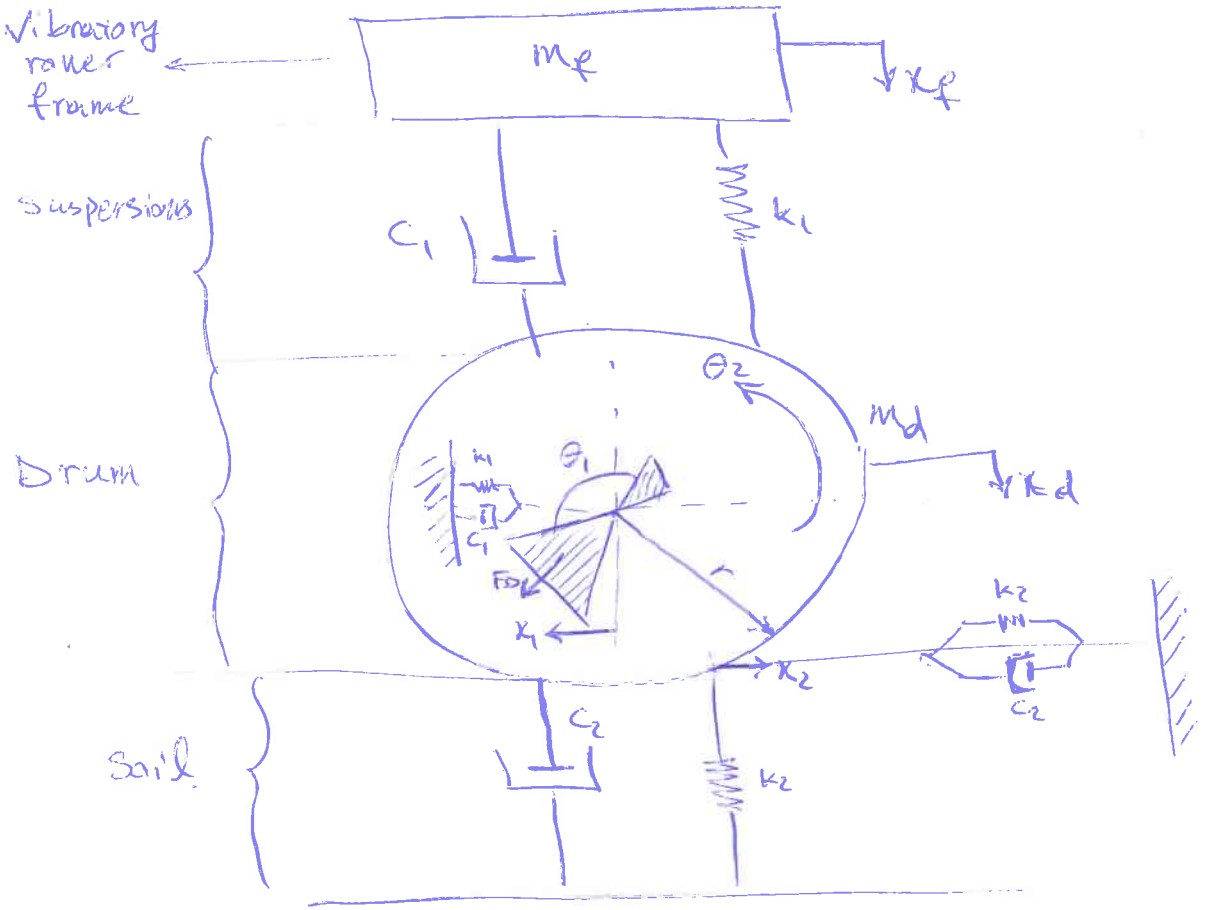
- $m_d \ddot{x}_d + (C_1 + C_2)\dot{x}_d + (k_1 + k_2)x_d - C_1\dot{x}_f - k_2 x_f = (m_1 + m_2\cos\theta_1) r\omega^2 \sin(\omega t) - F_s + m_d g$

- $m_f \ddot{x}_f - C_1(\dot{x}_d - \dot{x}_f) - k_1(x_d - x_f) = m_f \cdot g$

- $\bar{J}\ddot{\theta}_2 + r^2 C_2 \dot{\theta}_2 + r^2 k_2 \theta_2 - r C_2 \dot{x}_1 - r k_2 x_1 = 0$

- $m_d \ddot{x}_1 + (C_1 + C_2)\dot{x}_1 + (k_1 + k_2)x_1 - r C_2 \dot{\theta}_2 - r k_2 \theta_2 = (m_1 + m_2\cos\theta_1) r\omega^2 \cos(\omega t)$



when $\theta_1 = 0$ $\therefore$ $F_D = Fe \sin(\omega t)$

$Fe = (m_1 + m_2) r\omega^2$

when $\theta_1 = 180°$ $\therefore$ $F_D = Fe \sin(\omega t)$

$Fe = (m_1 - m_2) r\omega^2$