~~20180103089~~

Class Test-2

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$$\frac{dx_1}{dt} = f_1(x_{1,0}, x_{2,0}, m_{1,0}, m_{2,0}, d_{1,0}) + \left(\frac{\partial f_1}{\partial x_1}\right)_0 (x - x_0) + \left(\frac{\partial f_1}{\partial x_2}\right)_0 (x_2 - x_{2,0}) + \left(\frac{\partial f_1}{\partial m_1}\right)_0 (m_1 - m_{1,0}) + \left(\frac{\partial f_1}{\partial m_2}\right)(m_2 - m_{2,0}) + \left(\frac{\partial f_1}{\partial d_1}\right)_0 (d_1 - d_{1,0})$$

and:

$$\frac{dx_2}{dt} = f_2(x_{1,0}, x_{2,0}, m_{1,0}, m_{2,0}, d_{2,0}) + \left(\frac{\partial f_2}{\partial x_1}\right)_0 (x_1 - x_{1,0}) + \left(\frac{\partial f_2}{\partial m_1}\right)_0 (m_1 - m_{1,0}) + \left(\frac{\partial f_2}{\partial m_2}\right)_0 (m_2 - m_{2,0}) + \left(\frac{\partial f_2}{\partial d_2}\right)_0 (d_2 - d_{2,0})$$

where all derivates have been computed at the point of linearization ~~(denot~~

Assume that point of linearization corresponds to steady state operation of the syste

$$x_1' = x_1 - x_{1,0} \qquad m_1 = m_1 - m_{1,0} \qquad d_1 = d_1 - d_{1,0}$$
$$x_2' = x_2 - x_{2,0} \qquad m_2' = m_2 - m_{2,0} \qquad d_2' = d_2 - 0'$$

$$\frac{dx_1'}{dt} = a_{11}x_1' + a_{12}x_2' + b_{11}m_1' + b_{12}m_2' + c_1 d_1'$$

$$\frac{dx_2'}{dt} = a_{21}x_1' + a_{22}x_2' + b_{21}m_1' + b_{22}m_2' + c_2 d^{2'}$$

$$a_{11} = \left(\frac{\partial f_1}{\partial x_1}\right)_0 \qquad a_{12} = \left(\frac{\partial f_1}{\partial x_2}\right)_0 \qquad b_{11} = \left(\frac{\partial f_1}{\partial m_1}\right)_0$$
$$b_{12} = \left(\frac{\partial f_1}{\partial m_2}\right)_0 \qquad c_1 = \left(\frac{\partial f_1}{\partial d_1}\right)_0$$

and

$$a_{21} = \left(\frac{\partial f_2}{\partial x_1}\right)_0 \qquad a_{22} = \left(\frac{\partial f_2}{\partial x_2}\right)_0 \qquad b_{21} = \left(\frac{\partial f_2}{\partial m_1}\right)_0$$
$$b_{22} = \left(\frac{\partial f_2}{\partial m_2}\right)_0 \qquad (c_2 \text{ is } \left(\frac{\partial f_2}{\partial d_2}\right)_0$$