

Linearized Models

$$\Delta \dot{\rho} \approx \frac{R}{I_x} (\Delta f_2 + \Delta f_3 - \Delta f_1 - \Delta f_4) \quad R = \frac{d}{\sqrt{I}}$$

$$\Delta \dot{\varphi} \approx \frac{R}{I_y} (\Delta f_3 + \Delta f_4 - \Delta f_1 - \Delta f_2)$$

$$\Delta \dot{r} \approx \frac{\kappa}{I_z} (\Delta f_2 + \Delta f_4 - \Delta f_1 - \Delta f_3)$$

$$\Delta \dot{\psi}^E = -g \Delta \Theta$$

$$\Delta \dot{r}^E \approx g \Delta \Phi$$

$$\Delta \dot{\omega}^E \approx \frac{1}{m} (-\Delta f_1 - \Delta f_2 - \Delta f_3 - \Delta f_4)$$

$$\Delta \dot{\phi} \approx \Delta \rho$$

$$\Delta \dot{\Theta} \approx \Delta \varphi$$

$$\Delta \dot{\psi} \approx \Delta r$$