

2.7

The equations of motion in the body axes are derived in Chap. 10.

Degrees of freedom:

Functional relations:

$$D = D(h, V, \alpha), \quad L = L(h, V, \alpha), \quad T = T(h, V, P), \quad C = C(h, V, P)$$

$$\dot{x} = U \cos \Theta + W \sin \Theta$$

$$\dot{h} = U \sin \Theta - W \cos \Theta$$

$$\dot{U} = -W\dot{\Theta} + \frac{1}{m} [T \cos \epsilon_0 + L \sin \alpha - D \cos \alpha - mg \sin \Theta]$$

$$\dot{W} = U\dot{\Theta} - \frac{1}{m} [T \sin \epsilon_0 + L \cos \alpha + D \sin \alpha - mg \cos \Theta]$$

$$\dot{\Theta} = \dot{\Theta}$$

$$mg = -CT$$

$$V = \sqrt{U^2 + W^2}$$

$$\tan \alpha = \frac{W}{U}$$

Variables: $x, h, U, W, \Theta, m, \dot{\Theta}, V, P, \alpha$.

$$\begin{array}{r} 10 \text{ variables} \\ 8 \text{ eqns.} \\ \hline 3 \text{ m.dof.} \end{array}$$