

Rockets & Missiles

WAFFLE'S CRAZY PEANUT

(Last updated: 28/10/15)

1 Chapter 3 Formulas:

Basic substitutions:

$$\psi_0 = \frac{F}{m_0 g_0}$$

$$\Lambda = \frac{m_0}{m_0 - \dot{m}_0 t}$$

$$P(t) = 1 - \frac{1}{\Lambda}(\ln \Lambda + 1)$$

(for constant thrust),

$$t_b = \frac{I_{sp}}{\psi_0} \left(1 - \frac{1}{\Lambda}\right)$$

(for constant specific thrust),

$$t_b = \frac{I_{sp}}{\beta_0} \ln \Lambda$$

1.1 Vertical flight:

$$v = g_0 I_{sp} \ln \Lambda - g_0 t$$

$$t_c = I_{sp} \ln \Lambda$$

$$h(t) = g_0 \frac{I_{sp}^2}{\psi_0} P(t) - \frac{1}{2} g_0 t^2$$

$$h(t_c) = g_0 \frac{I_{sp}^2}{\psi_0} \left(\frac{1}{2} \psi_0 (\ln \Lambda)^2 - \ln \Lambda + 1 - \frac{1}{\Lambda} \right)$$