Constant: m, g, c_L, ρ_A, ρ_w, S, A_f

A_{f_a}, A_{f_w}, v, c_{D_S}, c_{D_f}, W, vary by time, but will be discretized by state

lift & drag of the tail are small and vary on desired moment, so ignored

each state transition is instantaneous

$F_L = .5c_L\rho_A V_x^2 S$

$F_B = v g \rho_w$

$F_G = mg$

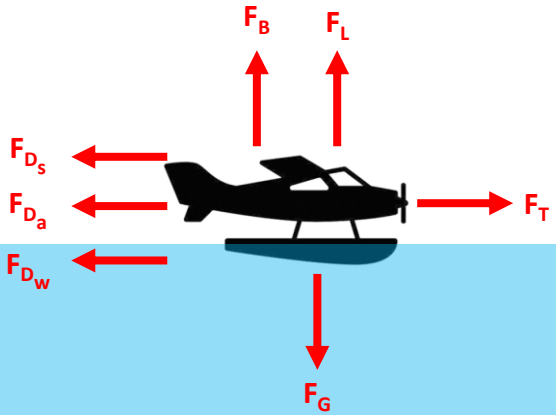
$F_T = T(V_x)$

$F_{D_S} = .5c_{D_S}\rho_A V_x^2 S$

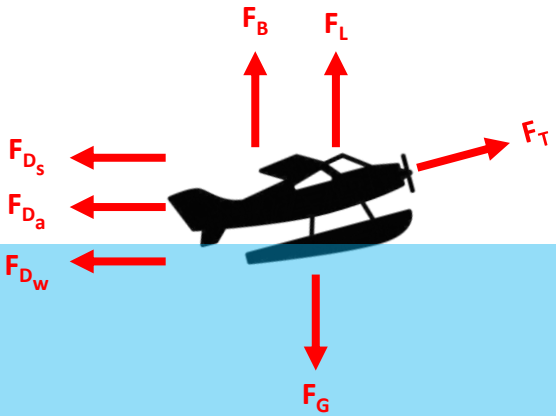
$F_{D_a} = .5c_{D_f}\rho_A V_x^2 A_{f_a}$

$F_{D_w} = W * A_{f_w} * V_x^2$

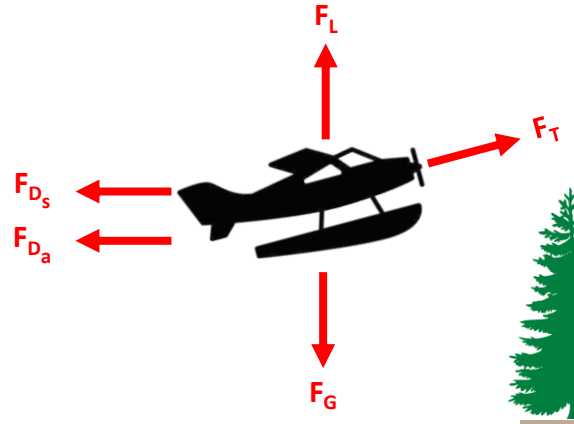
$A_f = A_{f_a} + A_{f_w}$



$V_x > V_{planing}$



$F_L > F_G$



$F_T - F_{D_S} - F_{D_a} - F_{D_w} = m\frac{d^2x}{dt^2}$

some c_{D_S}, c_{D_f}, A_{f_a}, A_{f_w}, W

$F_L + F_B - F_G = 0$

some v (not needed)

$F_T - F_{D_S} - F_{D_a} - F_{D_w} = m\frac{d^2x}{dt^2}$

some c_{D_S}, c_{D_f}, A_{f_a}, A_{f_w}, W

$F_L + F_B - F_G = 0$

some v (not needed)

$F_T - F_{D_S} - F_{D_a} = m\frac{d^2x}{dt^2}$

some c_{D_S}, c_{D_f}

$F_L - F_G = m\frac{d^2y}{dt^2}$

$x_{liftoff}$

How does F_T affect x?

$x_{50'}$