Assignment 06

The data used in evaluating this assignment have passed.

1. For a Fixed Wing Aircraft, the following data is applicable:

   Weight of aircraft = 300 kg
   V_{max} = 350 km/h
   M_{max} = 1.2356 (kg/m^2)
   C_{Lmax} = 4.5279
   \rho_0 = 0.9
   \mu_0 = 8.6203
   e = 5.9
   c = 2.39 (m)
   \gamma = 1.3
   \alpha = 0.6

   Useful Formulas:

   \[ C_{L} = C_{L0} + C_{L\alpha} \]
   \[ C_{D} = C_{D0} + C_{D\alpha} \]
   \[ C_{M} = C_{M0} + C_{M\alpha} \]
   \[ C_{L} = -\frac{\alpha}{\pi} + \frac{1}{2} \left( \frac{h}{c} - \frac{h}{c} \right) \]
   \[ C_{D} = \frac{C_{D0}}{e} \left( h - h \right) \]
   \[ C_{M} = \frac{C_{M0}}{e} \left( h - h \right) \]

   The concentrators have their usual aerodynamic meaning.

Note 1: (neglect the effect of heaving on stability)

Note 2: (Location of aerodynamic center of wing and axial has been measured from the wing leading edge)

The location of the flaps in meters at the forward wing (from the leading edge of the wing):

3. Identify the type of fixed wing aircraft:

4. Analytical Answers:

   a) Include the static stability derivatives ($C_{D\alpha}$) for each section of the aircraft.

   b) Identify the stall induced lift coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   c) Identify the maximum lift coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   d) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   e) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   f) Identifiy the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   g) Identifiy the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   h) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   i) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   j) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   k) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   l) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   m) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   n) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   o) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   p) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   q) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   r) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   s) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   t) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   u) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   v) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   w) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   x) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   y) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.

   z) Identify the maximum moment coefficients at two different angles of attack ($\alpha_1$ and $\alpha_2$) of the Fixed Wing Aircraft.