AE612 : Atmospheric Flight Mechanics

Assignment - 2

The aircraft parameters that can be used for the simulation are as follows.

Table 1: *Geometry, Mass and Inertia Characteristics*

Mean Aerodynamic Chord, $\bar{c}$	1.211 m
Wing Span, b	10.47 m
Aspect Ration, AR	8.8
Wing Area, S	12.47 m^2
Mass, m	750 kg

The aerodynamic model for the aircraft is given in the equations as follows.

Longitudinal Aerodynamic Model

$$C_L = C_{L_0} + C_{L_\alpha}\alpha + C_{L_{\delta_e}}\delta_e$$

$$C_D = C_{D_0} + KC_L^2$$

Aerodynamic Derivatives

(a) *Longitudinal*

C_{D_0} = 0.036	C_{L_0} = 0.365	C_{m_0} = 0.05
C_{D_α}= 0.041	C_{L_α} = 4.2	C_{m_α} = -0.59
e = 0.9	C_{L_q} = 27.3	C_{m_q} = -9.3
$C_{D_{\delta_e}}$ = 0.026	$C_{L_{\dot{\alpha}}}$ = 8.3	$C_{m_{\dot{\alpha}}}$ = -4.3
$C_{L_{max}}$ = 1.8	$-C_{L_{max}}$ = -0.8	$C_{m_{\delta_e}}$ = -1.008

Provide appropriate comments and justification about the plots. Proper justifications are required for your comments. Try to use the plots in a proper way to support your comments. Try not to cluster everything in one plot. The codes have to submitted along with the report in a zip file, with file name as "**SCnumber.zip**"

Copying in any aspect will result in NO MARKS for all assignments.