Problem Statement

Determination of neutral point of and aircraft

Q1. Consider the following data of a light experimental fixed wing conventional aircraft: m = 700 kg; s = 12.47 $m2$; $\bar{c}$ = 1.411 m ; b = 10.47
Using the following flight test data of from the experimental aircraft estimate the Neutral point of the configuration. The CG location is w.r.t leading edge of mean aerodynamic chord. Consider rounding off to four digits.

For X_cg1 = 1.2061 m

S.No	V (m/s)	$CL(trim)$	$\delta_{e_{(trim)}}$
1	40	0.561920036659411	0.0348103115873433
2	44	0.464396724511910	0.0439548029647466
3	48	0.390222247680147	0.0509099386023218
4	52	0.332497063112078	0.0563226695783097
5	56	0.286693896254802	0.0606175059119099

For X_cg2 = 1.1698 m

S.No	V (m/s)	$C_{L_{(trim)}}$	$\delta_{e_{(trim)}}$
1	40	0.561920036659411	0.0167400623574207
2	44	0.464396724511910	0.0290207126920833
3	48	0.390222247680147	0.0383611544148755
4	52	0.332497063112078	0.0456302144126750
5	56	0.286693896254802	0.0513979909986841

For X_cg3 = 1.1335 m

S.No	V (m/s)	$C_{L_{(trim)}}$	$\delta_{e_{(trim)}}$
1	40	0.561920036659411	-0.00133018687250185
2	44	0.464396724511910	0.0140866224194200
3	48	0.390222247680147	0.0258123702274293
4	52	0.332497063112078	0.0349377592470403
5	56	0.286693896254802	0.0421784760854583

For X_cg4 = 1.0972 m

S.No	V (m/s)	$C_{L_{(trim)}}$	$\delta_{e_{(trim)}}$
1	40	0.561920036659411	-0.0194004361024244
2	44	0.464396724511910	-0.000847467853243328
3	48	0.390222247680147	0.0132635860399830
4	52	0.332497063112078	0.0242453040814057
5	56	0.286693896254802	0.0329589611722324

Q2. Estimate the Neutral point using flight test data from the experimental aircraft, you can find the flight data in the attached document.