Appendix A

Appendix

A.1 Calculate fixed CL

To determine the Lift coefficient C_L required, some data must be used as input:

- Mass of the aircraft: M $[kg]$

- Mach number: Ma $[-]$

- Load Factor: LF $[-]$

- Reference surface area: S_{ref} $[m^2]$

- Static pressure: P_S $[Pa]$

- Acceleration of gravity: g $[m/s^2]$

In CEASIOMpy P_S and g can be obtained from the altitude value by using the standard atmosphere function.

The Lift force of an aircraft is given by:

$$L = \frac{1}{2} \cdot q \cdot S_{ref} \cdot C_L \tag{A.1}$$

Dynamic pressure can be calculated as follow:

$$q = \frac{1}{2} \cdot \gamma \cdot P_s \cdot M^2 \tag{A.2}$$

and we know the lift force must be compensate the weight of the aircraft (time the load factor), so $L = M \cdot g \cdot LF$. With the first equation, we obtain:

$$C_L = \frac{M \cdot g \cdot LF}{q \cdot S_{ref}} \tag{A.3}$$