

Appendix A

Appendix

A.1 Calculate fixed C_L

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} [m²]
- Static pressure: P_S [Pa]
- Acceleration of gravity: g [m/s²]

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:

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

Dynamic pressure can be calculated as follow:

$$q = \frac{1}{2} \cdot \gamma \cdot P_s \cdot M \quad (A.2)$$

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:

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