UNIVERSITAT POLITÈCNICA DE CATALUNYA
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Interplanetary trajectories

Example: Earth to Mars case

Report

Degree: Master's degree in Aerospace Engineering
Course: 220301 - Aerodynamics, Flight and Orbital Mechanics
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Contents

List of Tables

List of Figures

1 | Figure example formats

FIGURE

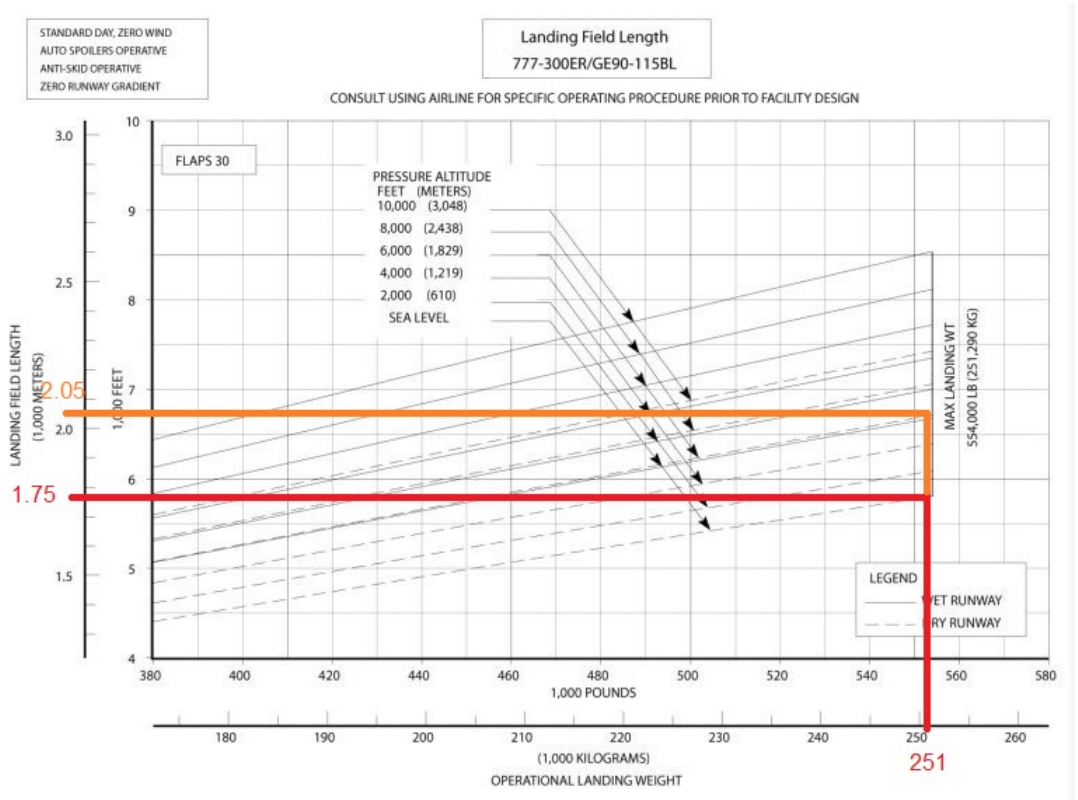

Figure 1.0.1: Landing distance vs MTOW for the Boeing 777.

TABLE

T_1	13 cm
T_2	21 cm
T_3	62 cm
T_t	95 cm

Table 1.0.1: Thickness after the materials correction factor.

2 | Aim

This projects aims to compute an interplanetary trajectory which, for a given ecliptic rectangular positions of two planets in two known time instances, is able to carry a spaceship with a unique impulse, from the first planet to the second.

3 | Theoretical background

3.1 Planetary orbits and approximations analysis

3.1.1 Patched Conic Approximation (PCA)

3.1.1.1 1st. Geocentric stage

3.1.1.2 2nd. Heliocentric stage

3.1.1.3 3rd. Planetocentric stage

4 | Calculations and results

5 Conclusions

6 | Bibliography

[1] J. Calaf, "Trajectòries interplanetàries: Patched Conic Approximation," 2017.

[2] ——, "Trajectòries interplanetàries," 2017.

[3] ——, "Treballs de Mecànica Orbital," 2017.