**Politecnico di Milano**

**Prova finale: Introduzione all’analisi di missioni spaziali**

AA 2022-2023

**Docente:**

**cognome**

**Elaborato n.**

**Codice elaborato**

**Autori:**

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**Data di consegna: gg/mm/aa**

# Table of contents

1. Introduction

2. Initial orbit characterisation

3. Final orbit characterisation

4. Transfer trajectory definition and analysis

5. Conclusions

6. Appendix

**Important:**

* *The text in red and grey font is given to ease understanding the contents of the report. Make sure it is removed before delivering your report.*
* *Make sure your report is no longer than 8 pages (from Section 1 to Section 5 included)*
* *Use your space to describe the work performed; do not explain the theory!*
* *Make sure the table in the Appendix is properly filled to allow an independent reproduction of your results.*

**1. Introduction**

Briefly describe the purpose of the assignment and how the team performed the activity and prepared the report and presentation.

**2. Initial orbit characterisation**

**2.1**

Determine initial orbital parameters from given position and velocity.

**2.2**

Discuss the result, evaluate other relevant orbit data.

**2.3**

Graphical representation of the orbit.

**3. Final orbit characterisation**

**3.1**

Determine final position and velocity from assigned final orbital parameters.

**3.2**

Discuss the characteristics of the orbit, evaluate other relevant orbit data.

**3.3**

Graphical representation of the orbit.

**4. Transfer trajectory definition and analysis**

**4.1**

Discuss how the final position and velocity can be achieved, starting from the initial orbit.

**4.2**

Discuss the possible transfer strategies, motivate the selection of one orbit transfer strategy and calculate the transfer trajectory, the manoeuvres v and transfer time.

**4.3**

Graphical representation of the initial, final and transfer orbit.

**5. Conclusions**

Briefly compare and analyse the presented transfer trajectories

**6. Appendix**

Fill the table below for each transfer presented in Section 4. The first and last row correspond to the given initial and final points, respectively. All the other 2\*N rows report the time and the orbital parameters across the N impulsive maneuvers Δvi.

**Transfer 1 (standard strategy)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| t (s) | a (km) | e (-) | i (rad) | Ω (rad) | ω (rad) | θ (rad) | Δv (km/s) |
| 0 | *init.point* | *init.point* | *init.point* | *init.point* | *init.point* | *init.point* | *-* |
| t1 | *before Δv1* | *before Δv1* | *before Δv1* | *before Δv1* | *before Δv1* | *before Δv1* | *Δv1* |
| *after Δv1* | *after Δv1* | *after Δv1* | *after Δv1* | *after Δv1* | *after Δv1* |
| t2 | *before Δv2* | … |  |  |  |  | *Δv2* |
| … |  |  |  |  |  |
| … | … |  |  |  |  |  | *…* |
| … |  |  |  |  |  |
| tf | *final point* | *final point* | *final point* | *final point* | *final point* | *final point* | *-* |

**Transfer 2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| t (s) | a (km) | e (-) | i (rad) | Ω (rad) | ω (rad) | θ (rad) | Δv (km/s) |
| 0 | *init.point* | *init.point* | *init.point* | *init.point* | *init.point* | *init.point* | *-* |
| t1 | *before Δv1* | *before Δv1* | *before Δv1* | *before Δv1* | *before Δv1* | *before Δv1* | *Δv1* |
| *after Δv1* | *after Δv1* | *after Δv1* | *after Δv1* | *after Δv1* | *after Δv1* |
| t2 | *before Δv2* | … |  |  |  |  | *Δv2* |
| … |  |  |  |  |  |
| … | … |  |  |  |  |  | *…* |
| … |  |  |  |  |  |
| tf | *final point* | *final point* | *final point* | *final point* | *final point* | *final point* | *-* |

To be continued for each transfer.