Research project meeting summary: Trajectory Module for Launcher MDAO

Jorge L. Valderrama [1]
Dr. Annafederica Urbano [2] Dr. Mathieu Balesdent [3]

[1]ISAE-SUPAERO, MSc. in Aerospace Engineering
[2]ISAE-SUPAERO, DECAS [3]ONERA, DTIS

January 27, 2020

Plan :

1. Review of previous work
2. Key points discussed
3. Future actions

Review of previous work

- Work with the Notebook available on GitHub for FELIN. Review of the following modules :
  - Aerodynamics
  - Trajectory phases : Functions for pitch angle during lift-off, pitch-over, gravity-turn, exo-atmospheric command.
  - Propulsion. Geometrical constraints of the nozzle.
- Read the first paper shared by Dr. Balesdent. ”Simultaneous Propulsion System and Trajectory Optimization”

Key points discussed

- Official start of research project
- Focus on Literature review for first project report due at the end of February. After reading the bibliography shared by Dr. Balesdent, look for other meaningful papers in their references.
- Derivation of state equation with respect to control parameters. These parameters are the variables used in the trajectories phases. Ex. : The shape factor, and the initial and final values of pitch angle in the Bi-linear Tangent Law
- Standardized nomenclature to be fixed in the future
- Function describing the pitch angle between pitch over and gravity turn.

Future actions

- Write short summary after meetings
- Read the papers sent by Dr. Balesdent
- Deduce the equations of motion for the simplified 2D planar trajectories case with steady Earth in polar coordinates, constant thrust and aerodynamic model.
- Meeting with other students working on the LAST tool on the 29/01/2020
- SacLab meeting on the 30/01/2020