Simulation: James Webb Space Telescope

You have to derive the equations of the three-body problem and apply it to the motion of JWST (Sun, Earth, and JWST) on a Halo orbit at L2. You have to code up the equations of motion and simulate it for a year. You have to show the simulation results from various perspectives (Solar system, Earth-fixed, etc.). I would suggest, that instead of Halo orbit, start with simulation of JWST at L2. If you know about linear stability analysis, you can show that the motion around L2 has unstable solutions and thus your simulation of Halo orbit will most likely diverge! Focus on:

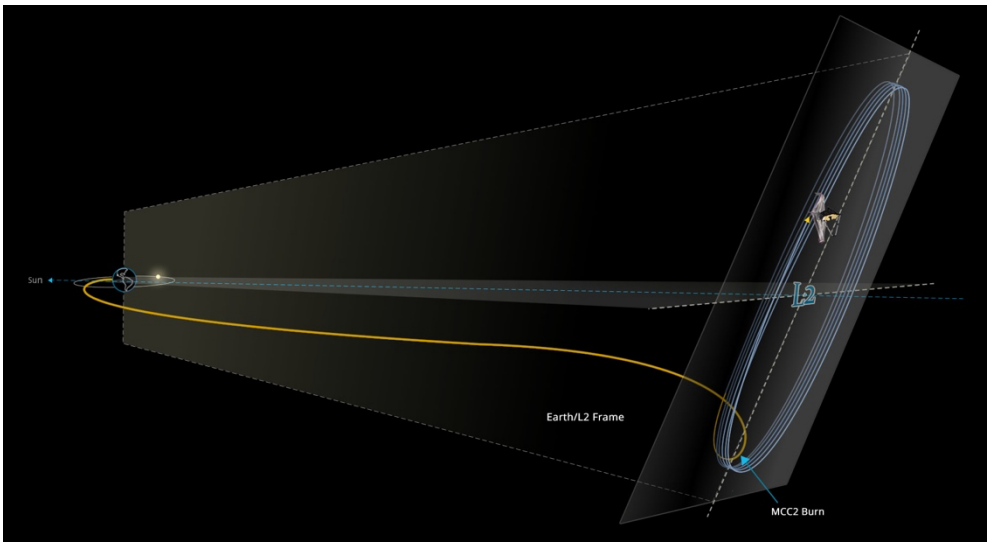
- clearly stating any assumptions and the justification
- figuring out the data you need and finding relevant information
- verification and validation of results
- creating pretty video ☺
- collaboration - sharing of knowledge and information with others

I have created a discussion board topic for this assignment. I expect everyone to participate - you are free to talk about assumptions you are making, approach you are taking (e.g., reference frames and axis systems), what kind of equations you obtain and why, data sources you are using (you can even post data/links in the discussion board), how you are validating/verifying your code, stability of simulation, and how to create movies from simulation outputs. You cannot share your code or your report. The minimum deliverables are:

1. Movie(s) of the simulation embedded in the discussion board
2. Report and code of the project submitted to this assignment

Feel free to do extra work ☺. For example:

1. Talk about and show via simulation the stability of an orbit at L2
2. Talk about and show via simulation some aspect of station keeping
3. Derive linearized equations about L2 and conduct small perturbation stability analysis
4. Compare the simulations using two different reference frames (Sun-fixed inertial, Sun-Earth-L2 rotating frame) or two different axis systems (Cartesian, Polar)



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