ASEN 6008: Interplanetary Mission Design

Description

The class ASEN 6008: Interplanetary Mission Design covers many topics in the field of astrodynamics that are useful when constructing conventional interplanetary mission designs.
The course focuses on simple ballistic mission designs, such as the interplanetary trajectories of Galileo, Cassini, New Horizons, and the various missions to Venus and Mars. Other types of interplanetary missions will also be briefly explored, such as SOHO's libration point trajectory design.

Outline

1. Review
    a. Two Body Problem
    b. N-Body Problem
    c. Patched Conics
    d. Reference Frames
    e. Sphere of Influence
2. Transfer Orbits
    a. Bi-elliptical
    b. Hohmann
    c. Lambert’s Problem
    d. PorkChop Plots (Type I, II, etc solutions)
    e. Minimum energy solutions
    f. Planetary Ephemerides
3. Gravity Assists
    a. Planetary flybys
    b. 2D, 3D evaluations
    c. Multiple Earth/Planet flybys
    d. Resonant Orbits
    e. Tisserand Plots
4. Departure and Arrival B-Planet Targeting
    a. Definition of B-Plane
    b. Applications of B-Plane in mission design
    c. Targeting
5. Thr Tc 0 TwT2

Kate Davis graduated from the University of Colorado at Boulder with a PhD in Aerospace Engineering in 2009. Since 2009, she has been a research associate for the Colorado Center for Astrodynamics Research where she specializes in the design and analysis of trajectories in the three-body problem. In addition to her work at CCAR, she has worked as a consultant for the Sierra Nevada Corporation (formerly MicroSat Systems). She began teaching Interplanetary Mission Design in 2006.

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