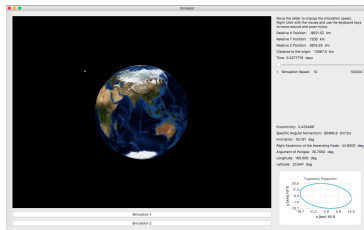


Project Portfolio (selected projects)




Gurgen (Greg) Hayrapetyan

June 28, 2017

Adaptive Cruise Control Simulation

Simulator



Speed: 10.0274 m/s
Steering Angle: -0.04 rad
Gap: 1.00016 m

1 m/s 100 m/s

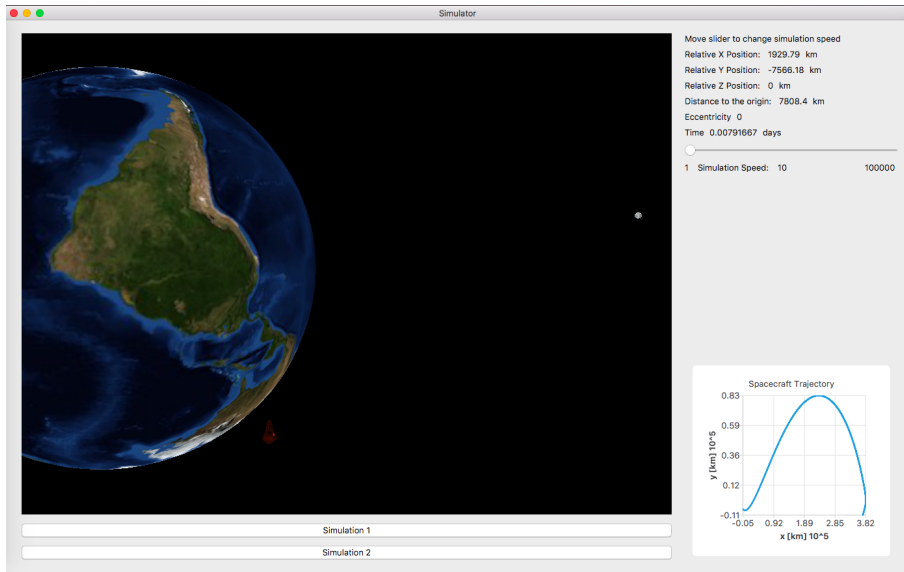
Lead Car Speed: 10 m/s 100 m/s

Simulation 1

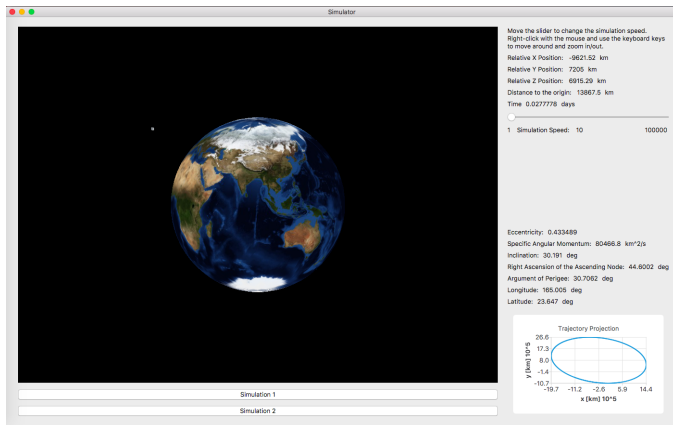
Simulation 2

Press A to steer left; Press D to steer right.

Restricted Three-Body Problem Simulation

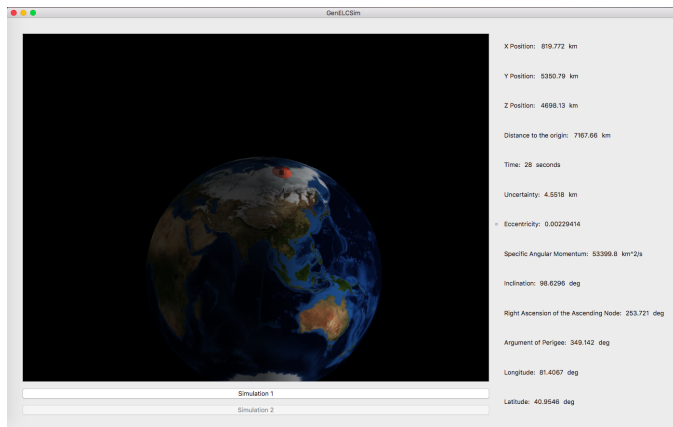


Deterministic Satellite Tracking



- Gibbs method
- Lambert's problem

Statistical Orbit Determination

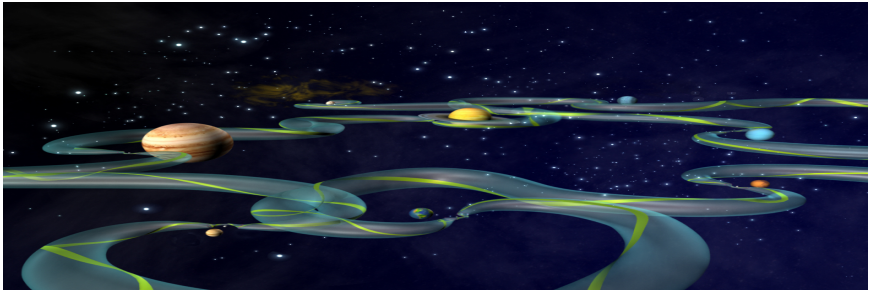


Active Work:

- Nonlinear system two point boundary value problem solver implementations in C++.
- Optimal control codes for orbital maneuvers.

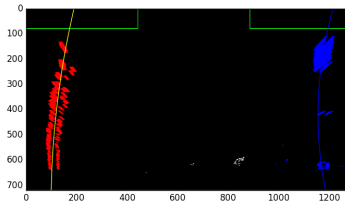
Related Theoretical Work - Invariant Manifold Theory

- Spectra of Functionalized Operators Arising from Hypersurfaces, ZAMP, (2014), (coauthors: Keith Promislow).
- Nonlinear Stability of Functionalized Flow (coauthors: Keith Promislow), expected. 2017.
- Main ideas: Understanding full nonlinear evolution in the state space given linearized motion near equilibrium structures.
- These ideas were pioneered in the orbital mechanics context by Martin Lo and the team at JPL to calculate paths near Lagrange points.



Source: From http://www.jpl.nasa.gov/releases/2002/release_2002_147.html

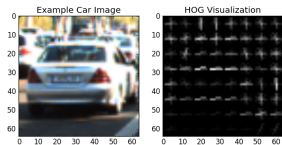
Computer Vision



left radius of curvature: 1724.52865939 m
right radius of curvature: 771.118527453 m
offset from center: -0.0090483319172 m



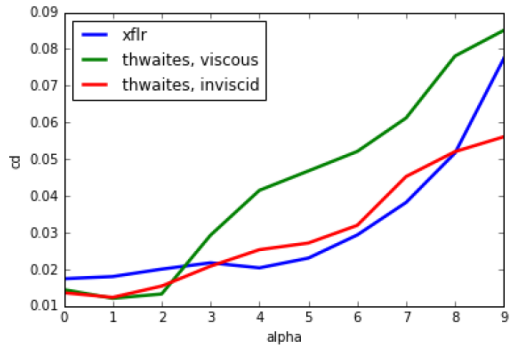
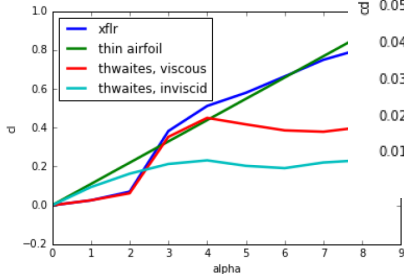
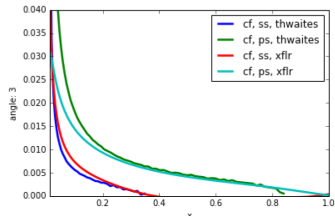
Vehicle Detection - Computer Vision and Machine Learning to Identify Vehicles



left radius of curvature: 2441.93 m
right radius of curvature: 540.10 m
offset from center: -0.22 m




Aerodynamics - Python Code for Calculating Lift and Drag Coefficients for Airfoil using Thwaites' Method and Comparison to XFLR



Stochastic Tool - Uncertainty Quantification Software for Engineering Design and Analysis

Standardization Wizard



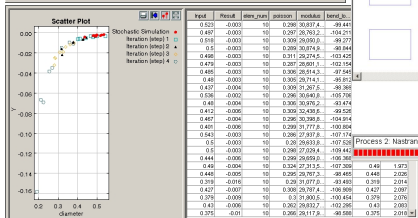
$$P(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

Most engineering calculations can be assumed to follow a normal distribution with 0% coefficient of variation. The distribution can be defined by specifying the mean and either the standard deviation or the coefficient of variation.

StdDev = (CoV * mean) / 100

Input: Distribution: Method:
 Mean: Coefficient of Variation (%):
 Design Improvement: ☐ Design Variable? ☐

Back Next Cancel

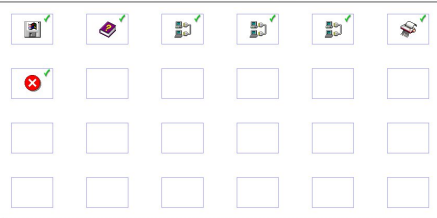


Stochastics

File Options

Process Map Size: Update Skip Simulation

Process Map



MSC SOFTWARE
SIMULATING REALITY

Process 2: Nastran Execution finished