

Problem Set

Modeling Flight Dynamics with Tensors

Lecture 2

Problem 1 Coordinate Transformation

Problem 2 Plane Projection Tensor N

Problem 3 Flat Plane

Lecture 3

Problem 1 Transformation Matrix

Problem 2 Geodetic Coordinates

Problem 3 IR Seeker Gimbal Transformation

Lecture 4

Problem 1 Rotation Tensors

Problem 2 Rotation Vector

Problem 3 1800 Rotation Tensor

Lecture 5

Problem 1 Orion Velocity

Problem 2 Propeller Tip-Speed

Problem 3 Matrix Manipulation

Lecture 6

Problem 1 Centroid of Delivery Pattern

Problem 2 Coriolis Transformation

Problem 3 Grubin Transformation

Lecture 7

Problem 1 Tensor Identity

Problem 2 Moment of Inertia

Problem 3 Rotary and Point-Mass Angular Momenta

Lecture 8

Problem 1 Shift of Aerodynamic Reference Point

Problem 2 Pull-Up in Non-Inertial Frame

Problem 3 Flying Towards Mars

Lecture 9

Problem 1 Gyroscopic Moment of Aircraft Engine

Problem 2 Nutation of Magnus Rotor

Problem 3 Energy Theorem Derivation

Lecture 10

Problem 1 Comparison of Perturbations

Problem 2 Aerodynamic Perturbations

Problem 3 Neglecting Terms of Small Order

Lecture 11

Problem 1 Pitching Moment Taylor Series Expansion

Problem 2 Replacing Tabular Dependency by Polynomial

Problem 3 Aero Derivative Table for Missiles