AE550 Spacecraft Attitude Dynamics and Control

우주비행체 동역학 및 제어

1. Instructor: Hyosang Yoon (윤효상, hyosang.yoon@kaist.ac.kr, N7 Room#4309, Ext. 3734)
2. Teaching assistant: TBD
3. Course objective
   A. At the end of this course, students shall be able to design and develop spacecraft attitude determination and control software with attitude sensors such as sun sensors, magnetometers, gyroscopes and star sensors and attitude actuators such as reaction wheels and magnetic torquers.
4. Textbook
   A. Lecture notes
5. Reference
   A. Marcel J. Sidi, "*Spacecraft Dynamics and Control*: a practical engineering approach", Cambridge University Press
   B. John L. Crassidis, John L. Junkins, "*Optimal Estimation of Dynamic Systems*", 2nd Ed. CRC Press
   C. Dan Simon, "*Optimal State Estimation: Kalman, Hinf, and Nonlinear Approaches*", A John Wiley & Sons, Inc.
6. Grading
   A. Attendance (20%)
   B. Homework (20%)
   C. Midterm Project (20%)
   D. Final Project (40%)
7. Lecture plan
   A. Week1: Attitude Representations and Applications (1)
   B. Week2: Attitude Representations and Applications (2)
   C. Week3: Spacecraft Attitude Kinematics
   D. Week4: Spacecraft Attitude Dynamics (1)
   E. Week5: Spacecraft Attitude Dynamics (2)
   F. Week6: Spacecraft Large Angle Maneuver
   G. Week7: Attitude Control with Reaction Wheels
   H. Week8: Midterm Project
   I. Week9: Disturbance Torques and Angular Momentum Management
   J. Week10: Attitude Sensors
   K. Week11: Static Attitude Estimation
   L. Week12: Introduction to Kalman Filter
   M. Week13: Attitude Kalman Filter (1)
   N. Week14: Attitude Kalman Filter (2)
   O. Week15: (Reserved)
   P. Week16: Final Project