330: 519 Advanced Topics in Systems Engineering, Spring 1997

Kalman Filtering

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Text-book: M. Grewal and A. Andrews, *Kalman Filtering: Theory and Practice*, Prentice Hall, Englewood Cliffs, 1993

Office Hours: After the class and by appointment

Class home page: http://www.ece.rutgers.edu/~gajic/519.html

Topics:

- Week 1: Introduction to Kalman Filtering and Linear Dynamic Systems (Chapters 1 and 2)
- Week 2: Review of Probability and Random processes (Sections 3.1-3.4)
- *Week 3*: Linear Stochastic Systems, Shaping Filters, Derivations of the Covariance Equation in Continuous- and Discrete-Time Domains, and Orthogonality Principle (Section 3.5–3.8)
- Week 4: Discrete- and Continuous-Time Kalman Filter (Sections 4.1-4.7)
- Week 5: Continuous- and Discrete-Time Riccati Equations (Sections 4.8-4.10)
- Week 6: Applications of Kalman Filters, Smoothers, Examples (Sections 4.11–4.13)
- Week 7: Discussion of Main Journal Papers on Kalman Filtering
- Week 8: Applications of Kalman Filter in Signal Processing and Communications (IEEE Transactions Journal Papers). Project Assignments

Week 9: Exam I

Week 10: Extended Continuous- and Discrete-Time Kalman Filters (Chapter 5)

Week 11: Implementation Methods (Sections 6.1–6.4)

- Week 12: Implementation Methods (Sections 6.5–6.8)
- Week 13: Practical Considerations (Chapter 7)
- Week 14: Project presentations

Grading:

Exam I 30% Project 30% Final Exam 40%