

AE 6505 RANDOM PROCESSES AND KALMAN FILTERING

Catalog Data:

Random Processes and Kalman Filtering

3-0-3. Prerequisite: AE 3501 or equivalent.

Probability and random variables and processes; Correlation; Shaping filters; Simulation of sensor errors; Wiener filter; Random vectors; Covariance propagation; Recursive least-squares; Kalman filter; Extensions.

Textbook:

Brown, Robert G., and Hwang, Patrick Y-C. : Introduction to Random Signals and Applied Kalman Filtering, 3rd Edn., John Wiley & Sons, New York, 1996.

Coordinator: B.L. Stevens

Goals:

This course will provide the background to understand the applications of filtering and estimation to guidance, navigation and control of aerospace vehicles, and to perform research involving random processes and estimation.

Topics

Hours

1.	Probability and Statistics	4
2.	Multiple Random Variables	2
3.	Random Processes, Auto- and Cross-Correlation	6
4.	Power Spectral Density	3
5.	System Input-Output Relationships	3
6.	Noise Models, Simulation	3
7.	Multiple Random Variables, Random Vectors	3
8.	Covariance Analysis	3
9.	Recursive Least-Squares, The Kalman Filter	9
10.	Applications of Kalman Filtering	4
	Quizzes and Instructor's option	5
	Total	<hr/> 45

Computer Usage:

Digital simulation will be used as a tool to promote understanding of some of the course topics. Individual simulation projects will be assigned.

Laboratory Projects:

None.