SYSE6325 - Optimal Estimation and Kalman Filter

SYSE 6325 (MECH 6325) Optimal Estimation and Kalman Filter (3 semester credit hours) Theory, analysis, design, and implementation of Kalman filters are covered in this course together with real-world applications of the theory. Topics include a review of probability and random variables; random signals and random processes; response of linear systems to random signals; the Wiener filter; the discrete-time Kalman filter; continuous-time Kalman filter; prediction and smoothing; the extended Kalman filter; the ensemble Kalman filter; the unscented Kalman filter; case studies in GPS and GPS-aided inertial navigation, simultaneous localization and mapping (SLAM), and amplitude and phase estimation in dynamic mode atomic force microscopy (AFM). Prerequisite: MECH 6300 or SYSM 6307. (3-0) R