Final Examination, **AOE 5784, Model-Based Estimation.** Fall 2024

Exam rules: Do all problems. Hand in completed exam by 1:00 p.m. on Wednesday Dec 18, 2024 via Canvas if enrolled in the on-line section or as a hard copy to Prof. Psiaki in his 335 Durham Hall office if enrolled in the in-class section. No collaboration or consultation is allowed with any other humans except Prof. Psiaki. He is willing to talk about problems if available. You may use (inanimate) outside sources (e.g. books). If you use such sources, then list them.

[10 pts] Problem Set 3, Number 8.

[10 pts] Problem 5-10 in Bar-Shalom

[20 pts] Problem Set 7, Number 1. Test using the inputs xk = [-0.40; 0.85; -0.60; -1.65], uk = [], and vk = [-0.77; 1.30; 1.65] with the continuous-time model function fscript_ts01.m and hand in your code along with fprinted, dfprinted_dxk, and dfprinted_dvk accurate to at least 14 decimal places (i.e., using Matlab's format long).

[20 pts] Problem Set 7, Number 3.

[20 pts] Problem Set 8, Number 4.

[20 pts] Problem Set 8, Number 7. Do this for the new data set measdata_pfexample02.mat, which will be posted on the course web site. Hand in your code, a plot of the smoothed state time history, and the a posteriori state estimate and its computed estimation error covariance at the final sample accurate to at least 14 decimal places (i.e., using Matlab's format long).