

12.990: Problem set 3

Compare and contrast the forecast PDFs that result from stochastic dynamic prediction, the Monte Carlo (ensemble) approximation to stochastic dynamic prediction, and the linear propagation of uncertainty. You may use the system of your choice as found on the Tools Section of this course, but be sure to explore the sensitivity to such things as the length of the forecast, the size/orientation of the initial uncertainty, and select a few different initial conditions. Discuss the implications of assuming that uncertainty evolves linearly, and the implications of interpreting ensemble forecasts as Gaussian distributions. Assume that all initial uncertainty distributions are Gaussian.

Rather than solving the Eulerian probability continuity equation, take a Lagrangian approach by propagating isopleths of uncertainty forward. You will find the script `ellipsePDF.m` found on the Tools Section of this course. useful for this and other aspects of the assignment.

Hand in your code, a brief write-up of your results, and any necessary figures.