CHEM/PHY 598

Info: You can work in groups, but all solutions must be written up independently. Many of the written problems –which are not assigned directly from the class textbook– are taken from a variety of other textbooks/papers. If any question requires a computational component, provide your written answer on one sheet, then the printout of your Mathematica notebook only for that problem on separate sheets following your write-up for that problem. Then repeat for each problem. i.e. do **not** staple a Mathematica notebook printout for all problems at the end of your problem set. **Only codes that are commented *at every step* and *whose logic can be easily followed* will be graded**.

DUE: **Tuesday** April 28th, 3PM.

Problem 1, Gaussian process:
Simulate a polynomial curve with Gaussian noise. Implement the Gaussian process to learn the shape of the underlying curve. Use a zero mean Gaussian process prior with the usual squared exponential kernel. To present your results, plot the posterior mean curve estimate (in a thick line) and all other curves sampled from your posterior as thin lines.

Problem 2, HMM:
Assuming a 2-state HMM with known transition matrix and known emission parameters (mean and standard deviation assuming a Gaussian noise model), implement the Viterbi algorithm. Compare your inferred Viterbi path to the exact results (i.e. your simulated two-state trajectory with Gaussian noise on which you ran Viterbi).