Homework 4 (Due on Oct 16)

October 9, 2014 STA 5934

Problem I

1. Sample observations $y_1, \ldots, y_{100}$ and $x_1, \ldots, x_{100}$ from $y_i \mid x_i = f(x_i) + \epsilon_i, \epsilon_i \sim N(0, 0.5), x_i \sim U(0,1)$, $f \sim GP(0, c)$, $c(x, x') = e^{-(x-x')^2}$.

2. Fit the model (based on the first 50 observations (training data)) $y_i = f(x_i) + \epsilon_i, \epsilon_i \sim N(0, \sigma^2)$ $f \sim GP(0, c)$, $c = e^{-\kappa(x-x')^2}$, $\sigma^2 \sim IG(a, b)$ and an *appropriate* discrete uniform prior on κ

3. Plot the posterior predictive mean and the 95 % point-wise credible intervals for the next 50 observations (test data) and estimate the coverage probability.

4. Assess sensitivity on the mean squared prediction error and the coverage probability with respect to the hyperparameters for the priors for σ^2 and κ.