

Problem Set 5

Statistics, Computation and Applications

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Problem 5.1: Flows and Correlations

For part (a),

For part (b),

For part (c),

Problem 5.2: Predicting Trajectories

For part (a),

For part (b),

Problem 5.3: Gaussian Processes

For part (a), consider the squared exponential/RBF covariance function

$$\kappa(x_i, x_j) = \sigma^2 \exp\left(-\frac{(x_i - x_j)^2}{2\ell^2}\right).$$

If the signal variance is increased, then all things equal, points will have a higher covariance. In other words, the covariance curve (as a function of distance $|x_i - x_j|$) is higher, the higher σ^2 is. This is shown in Figure [1a](#)

For part (b),

For part (c),

Figure 1: Effect of σ^2 and ℓ on the RBF covariance function $\kappa(x_i, x_j)$. Panel (a) shows the effect of varying σ^2 , when holding $\ell = 1$ constant. In panel (b) it is shown the effect of varying ℓ , holding $\sigma^2 = 1$ constant.

