HW #3

1. Bishop 6.4

2. Bishop 6.11

3. Bishop 6.15

4. GP regression

Re-use or recreate the Bessel function ($J_0(x)$) dataset from HW #1, problem 3.

Fit this data using GP with

(a) RBF kernel : $k(x_n, x_m) = e^{-\frac{\theta}{2}(x_n - x_m)^2}$

(b) exponential kernel: $k(x_n, x_m) = e^{-\theta|x_n - x_m|}$

→ Find $\hat{\theta}$, the optimal value of θ for both kernels, by maximizing $\log p(\vec{t}|\theta)$ wrt θ. Report both $\hat{\theta}$ and $\log p(\vec{t}|\hat{\theta})$.

→ For both kernels, find μ (mean) and σ (std. dev.) of the predictive distribution, using $\theta = \hat{\theta}$.

Plot $J_0(x)$, $\tilde{t}$, and $\mu \pm 6$ separately for each kernel.

Note: it is allowed to use standard GP implementations, as opposed to recreating GP regression from scratch