

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 and σ of the predictive distribution, using $\theta = \hat{\theta}$.

↓ mean ↓ std. dev.

Plot $J_0(x)$, \bar{t} , and $\mu \pm 5$
separately for each kernel.