Problem 1

(a)

Model:

Where we assume zero-mean i.i.d Gaussian nose:

So the predictive distribution given the model parameter is Gaussian:

Because the training data is nose free: and

We have

(b)

Prior

The probability of observing the given data under the prior

Where we have marginalized the unknown function values of

Let , the log-likelihood of the data under the Gaussian prior is

(c)

With Choleskey decomposition of and and

(d)

The matrix derivation is

The log determinant derivation is

The derivative of the log likelihood is then

With Cholesky Decomposition