

Fitting Gaussian Process model in different covariance function and parameters

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Covariance Family

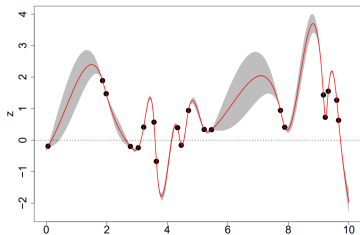
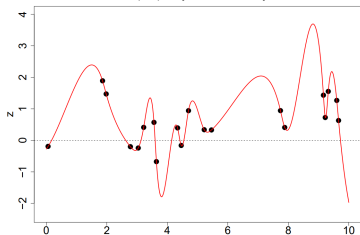
- Exponential : $C(h) = \sigma^2 \exp\left(-\frac{\|h\|}{\theta}\right)$
- Matern : $C(h) = \sigma^2 \frac{2^{1-\nu}}{\Gamma(\nu)} \left(\frac{\|h\|}{\theta}\right)^\nu K_\nu\left(\frac{\|h\|}{\theta}\right)$
 - ① $\nu = 1.5$: Matern 15
 - ② $\nu = 2.5$: Matern 25
 - ③ $\nu = 3.5$: Matern 35
 - ④ $\nu = 4.5$: Matern 45

Parameter

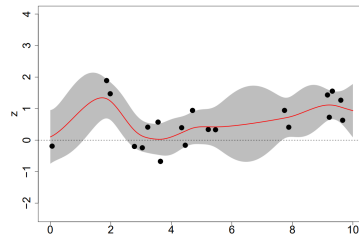
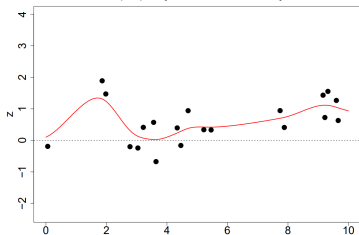
- $\sigma^2 > 0$: variance parameter
- $\theta > 0$: range parameter
- $\tau^2 \geq 0$: nugget effect

Nugget Effect

$$\hat{Y}(x) (\tau^2 = 0)$$



$$\hat{Y}(x) (\tau^2 = 0.25)$$



Demo : predict 2-dim surface

- Training data in homework 5

