

QBUS6850: Tutorial 3 – Practicing Linear Regression

Task Document

1. Question

- Generate synthetic data from a 2nd order polynomial (quadratic):

$$f(x) = 4 + 1.5x + 3.2x^2.$$

- Add noise to the linear model

$$\mathbf{t} = f(x) + \epsilon.$$

- Produce a scatter plot \mathbf{t} against x , add the true values $f(x)$ to the plot.
- Fit a linear model to the data, using the normal equation: $\boldsymbol{\beta} = (\mathbf{X}^T \mathbf{X})^{-1} \mathbf{X}^T \mathbf{t}$ to estimate β_0 and β_1 .
- Fit a quadratic regression model to the data, using normal equation to estimate parameters.