Homework2

Name:
Student ID:
Statistical Learning for Data Science

Due time: March 20, 2023 (Monday) 12:00am

1 Proof

Proof the bias-variance trade-off in detail:
(hint: bias/variance decomposition of MSE)

2 Proof

For simple linear regression, proof:

$$\mathrm{Var}(\hat{\beta}_0) = \mathrm{SE}(\hat{\beta}_0)^2 = \sigma^2 \left[\frac{1}{n} + \frac{\bar{x}}{\sum_{i=1}^{n} (x_i - \bar{x})^2} \right]$$

$$\mathrm{Var}(\hat{\beta}_1) = \mathrm{SE}(\hat{\beta}_1)^2 = \frac{\sigma^2}{\sum_{i=1}^{n} (x_i - \bar{x})^2}$$

3

Exercises in Section 3.7 of the textbook: 1, 2, 3, 4, 5, 6, 7

The electronic version should be sent in PDF format in the form of "homework2-name-student ID" to 12032795@mail.sustech.edu.cn