DATA130013: Homework 2

Due in class on March 29, 2018

1. Shumway's book (4th ed.) Problems 1.14, 1.18, 1.19, and 1.25(b).
2. Refer to page 48, consider the simple linear regression, $t = 1, \ldots, n$,

$$X_t = \beta_0 + \beta_1 Z_t + W_t,$$

where $W_t \sim \mathrm{N}(0, \sigma^2)$ are i.i.d. random errors. Derive the OLS estimates

$$\hat{\beta}_1 = \frac{\sum_{t=1}^{n}(X_t - \bar{X})(Z_t - \bar{Z})}{\sum_{t=1}^{n}(Z_t - \bar{Z})^2}, \quad \hat{\beta}_0 = \bar{X} - \hat{\beta}_1 \bar{Z}.$$

Notice that $\hat{\beta}_1$ is actually related to the sample correlation between X and Z.