

EEB 581, Problem Set Five

Due Tuesday, 23 Feb. 2004

1 : Consider quadratic regression forced through the origin, $y_i = \beta_1 x_i + \beta_2 x_i^2 + e_i$.

- (a) For n observations, write this in matrix form.
- (b) What is the OLS estimator for β_1 and β_2 .
- (c) What is the variance-covariance matrix for these estimates?

2 : Suppose you have the following data for 50 observations

$$\sum_i x_i^2 = 300, \quad \sum_i x_i^3 = 100, \quad \sum_i x_i^4 = 12000, \quad \sum_i x_i y_i = -200, \quad \sum_i x_i^2 y_i = 600$$

- (a) Compute the OLS estimate of β_1 and β_2 .
- (b) Suppose $\sum (y_i - \hat{y}_i)^2 = 400$. Estimate σ_e^2
- (c) Compute $\sigma^2(\hat{\beta}_1)$.
- (d) Compute $\sigma^2(\hat{\beta}_2)$.
- (e) Compute $\sigma(\hat{\beta}_1, \hat{\beta}_2)$