

1. The values of variables  $y$ ,  $x_1$  and  $x_2$  in Table3.2 on p76 are stored in file Table32.txt.

Consider model  $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \epsilon$ ,  $\epsilon \sim N(0, \sigma^2)$ .

Keep 5 digits after decimal point for all final presented results.

(1) Find the value of  $\hat{\beta}_0$ , the LSE and MLE for  $\beta_0$ .

(2) Find  $\text{var}(\hat{\beta}_0)$ .

(3) Find the value of standard error for  $\hat{\beta}_0$ .

2. With data in 1 consider model  $y = \beta_1 x_1 + \beta_2 x_2 + \epsilon$ ,  $\epsilon \sim N(0, \sigma^2)$ .

Let  $x_0 = \begin{pmatrix} x_{01} \\ x_{02} \end{pmatrix} = \begin{pmatrix} 10 \\ 300 \end{pmatrix}$ .

Keep 5 digits after decimal point for all final presented results.

(1) Find  $\hat{y}(x_0)$ .

(2) Find  $S_{\hat{y}(x_0)}^2$  and  $S_{\hat{y}(x_0)}$ .