

國立中正大學九十九學年度博士班招生考試試題
系所別 (組別) : 財務金融學系(甲組) 科目 : 統計學

Note: you are allowed to use a calculator (if needed). All questions are equally weighted.

1. Suppose y is a $T \times 1$ vector of dependent variables. X is a $T \times K$ matrix of independent variables. β is $K \times 1$ a vector of unknown coefficients. e is a $T \times 1$ vector containing the error terms. Write the equation for the ordinary least squares estimator for the unknown coefficients (in matrix notation).
2. Suppose b is the ordinary least squares estimator for problem (1). Let the error term be computed as $\hat{e} = y - Xb$. Write the equation for an unbiased estimator of the error variance (in matrix notation).
3. Write the equation (in matrix notation) for the covariance matrix of the least squares estimator in problem (1).
4. The proportion of variation in the dependent variable explained by the estimated function is given by the coefficient of determination. Write the equation (in matrix notation) for the coefficient of determination for problem (1).
5. How do you compute the standard errors for ordinary least squares estimator of problem (1)?
6. Consider the roll of a balanced die. Let event A represent the observation of four or less, and let B represent an odd number. What is the probability of A given that event B has occurred?
7. Suppose you randomly draw one card from a standard 52-card deck. Let A be the event 'red face card' and let B be the event 'heart'. What is the probability of getting either a red face card or a heart?