

1. Please answer the following questions about standard error (20 分)
 - a. What is the equation for standard error? (2 分)
 - b. Describe the differences between standard deviation and standard error. (8 分)
 - c. Why is standard error important? (5 分)
 - d. What is Central Limit Theorem? (5 分)

2. Given a simple linear regression model, $Y = \beta_0 + \beta_1 X + \varepsilon$, please answer the following question (30 分)
 - a. What is the equation to estimate β_1 ? (5 分)
 - b. What is the equation to estimate β_0 ? (5 分)
 - c. What are the assumptions for the simple linear regression model? (10 分)
 - d. Which hypothesis test method is used to test model overall goodness of fit? (2 分)
 - e. What is Sum of Square Total, Sum of Square Regression, and Sum of Square Error? (6 分)
 - f. What is the equation to estimate coefficient of determination? (2 分)

3. There are n people go into a restaurant. At the door, they all hang their coats on the coatrack near the entrance. Suddenly, there is a fire. All of them run towards the door. Before exiting the door, each grabs a coat at random as they leave the door. Let $X_j = 1$ if the j -th person gets his/her own coat, and $X_j = 0$ if j -th person gets another person's coat. Let X be the number of people who get their own coat. Find $E(X)$. (10 分)

4. Please answer the following questions about hypothesis testing (20 分)
 - a. What is the test statistics for Student's t -test? (4 分)
 - b. What is the test statistics for Chi-square Test of Hypothesized Count? (4 分)
 - c. What is the test statistics for Two-Samples Unpaired Data Student's t -test? (4 分)
 - d. What is the test statistics for ANOVA F -test between a reduced and a full model? (4 分)
 - e. What is Type I error? (4 分)

5. Please answer the following questions about Generalized Linear Model (20 分)
 - a. If your response variable y is either 0 or 1, what link function will you use? (5 分)
 - b. If your response variable y is normally distribution, what link function will you use? (5 分)
 - c. If your response variable y is count, what link function will you use? (5 分)
 - d. If your data is organized into $r \times c$ contingency data with count in each cell, which regression model will you use? (5 分)

試題隨卷繳回