

## STA 3180 Statistical Modelling: Robust Statistics

1. What is the definition of robust statistics?

Answer: Robust statistics is a branch of statistics that focuses on methods that are not overly sensitive to outliers or other deviations from the assumed model. It is designed to provide reliable results even when the data is contaminated with outliers or when the underlying assumptions of the model are violated.

2. What is the difference between robust and classical statistics?

Answer: Classical statistics relies on assumptions about the data, such as normality, homoscedasticity, and independence. Robust statistics does not rely on these assumptions and instead uses techniques that are more resistant to outliers and other deviations from the assumed model.

3. What is the purpose of robust statistics?

Answer: The purpose of robust statistics is to provide reliable results even when the data is contaminated with outliers or when the underlying assumptions of the model are violated.

4. What are some common robust estimators?

Answer: Some common robust estimators include the median, trimmed mean, Winsorized mean, M-estimators, and robust regression.

5. What is the difference between a median and a mean?

Answer: The median is the middle value of a set of data, while the mean is the average of all the values in the set. The median is less affected by outliers than the mean, making it a more robust estimator.

6. What is the difference between a trimmed mean and a Winsorized mean?

Answer: A trimmed mean is calculated by removing a certain percentage of the highest and lowest values from the data set before calculating the mean. A Winsorized mean is calculated by replacing the highest and lowest values with the next highest and lowest values before calculating the mean. Both methods are used to reduce the effect of outliers on the mean.

7. What is an M-estimator?

Answer: An M-estimator is a type of robust estimator that uses a function to minimize the sum of absolute residuals. This type of estimator is resistant to outliers and can be used to estimate parameters in a variety of models.

8. What is robust regression?

Answer: Robust regression is a type of regression analysis that is designed to be resistant to outliers. It uses a variety of techniques, such as M-estimators and weighted least squares, to reduce the effect of outliers on the regression results.