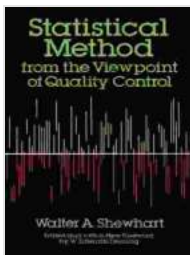


Statistical Method From The Viewpoint Of Quality Control Dover On Mathematics

Statistical methods are a powerful tool for quality control. They can be used to identify and eliminate sources of variation, improve processes, and ensure that products meet specifications. In this article, we will discuss the basic principles of statistical methods from the viewpoint of quality control. We will also provide some examples of how statistical methods can be used to improve quality.

Basic Principles of Statistical Methods

Statistical methods are based on the idea of probability. Probability is a measure of the likelihood that an event will occur. It is expressed as a number between 0 and 1, where 0 indicates that the event is impossible and 1 indicates that the event is certain. Another way of looking at probability is as the fraction of the overall sample or population that has the characteristic in question.



Statistical Method from the Viewpoint of Quality Control (Dover Books on Mathematics) by Walter A. Shewhart

★★★★☆ 4.3 out of 5

Language : English
File size : 2881 KB
Text-to-Speech : Enabled
Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 180 pages
Lending : Enabled



Statistical methods use probability to make inferences about a population based on a sample. A sample is a small subset of the population that is used to represent the entire population. By studying the sample, we can learn about the characteristics of the population.

There are two main types of statistical methods: descriptive statistics and inferential statistics. Descriptive statistics are used to summarize and describe data. Inferential statistics are used to make inferences about a population based on a sample.

Descriptive Statistics

Descriptive statistics are used to summarize and describe data. The most common descriptive statistics are the mean, median, mode, range, and standard deviation.

- The mean is the average of a set of data. It is calculated by adding up all the numbers in the set and dividing by the number of numbers in the set.
- The median is the middle number in a set of data. If the set of data has an even number of numbers, the median is the average of the two middle numbers.
- The mode is the number that occurs most often in a set of data.
- The range is the difference between the largest and smallest numbers in a set of data.
- The standard deviation is a measure of the spread of a set of data. It is calculated by finding the square root of the variance, which is the

average of the squared differences between each number in the set and the mean.

Descriptive statistics can be used to create a variety of graphs and charts that can help to visualize data and identify trends.

Inferential Statistics

Inferential statistics are used to make inferences about a population based on a sample. The most common inferential statistics are hypothesis testing and confidence intervals.

- Hypothesis testing is used to test whether there is a statistically significant difference between two groups. A hypothesis test is conducted by first stating a null hypothesis, which is a statement that there is no difference between the two groups. The null hypothesis is then tested by collecting data from a sample and calculating a test statistic. The test statistic is then compared to a critical value to determine whether the null hypothesis can be rejected.
- Confidence intervals are used to estimate the true value of a population parameter. A confidence interval is calculated by taking a sample from the population and calculating the mean of the sample. The confidence interval is then calculated by adding and subtracting a margin of error from the mean. The margin of error is determined by the size of the sample and the level of confidence desired.

Inferential statistics can be used to make decisions about a population based on a sample. For example, a hypothesis test can be used to determine whether a new product is more effective than an existing

product. A confidence interval can be used to estimate the average income of a population based on a sample of incomes.

Examples of How Statistical Methods Can Be Used to Improve Quality

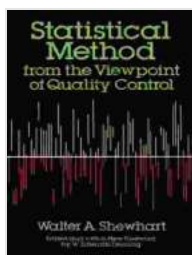
Statistical methods can be used to improve quality in a variety of ways.

Here are a few examples:

- Statistical methods can be used to identify and eliminate sources of variation. Variation is the enemy of quality. It can lead to defects, product failures, and customer dissatisfaction. Statistical methods can be used to identify the sources of variation in a process and eliminate them.
- Statistical methods can be used to improve processes. Once the sources of variation have been identified, statistical methods can be used to improve the process. This can be done by adjusting the process parameters, changing the equipment, or training the operators.
- Statistical methods can be used to ensure that products meet specifications. Statistical methods can be used to sample products and test them to ensure that they meet the desired specifications. This can help to prevent defective products from reaching the customer.

Statistical methods are a valuable tool for quality control. They can be used to identify and eliminate sources of variation, improve processes, and ensure that products meet specifications. By using statistical methods, companies can improve the quality of their products and services, and increase customer satisfaction.

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