



SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF MECHANICAL ENGINEERING



SENSORS AND INSTRUMENTATION



Guess Today's Topic????





Statistical Analysis



- To perform a statistical analysis of errors in a measurement system, you would typically follow these steps:





Statistical Analysis



- Define the measurement process:

Identify the variable you want to measure and define the measurement process. For example, if you are measuring the length of a rod, you need to specify the instrument used for measurement and the measurement method.





Statistical Analysis



- Collect data: Collect data by taking multiple measurements of the same variable under the same conditions. It is important to repeat the measurements to get an estimate of the variation in the measurements.





Statistical Analysis



- Analyze the data: Analyze the data using statistical techniques to identify the sources of variation in the measurements. You can use descriptive statistics like mean, standard deviation, and range to describe the central tendency and dispersion of the data. You can also use graphical methods like histograms and boxplots to visualize the distribution of the data.





Statistical Analysis



- Evaluate the measurement system: Evaluate the measurement system to determine its accuracy, precision, and reliability. Accuracy refers to how close the measurements are to the true value, precision refers to the consistency of the measurements, and reliability refers to the ability of the measurement system to produce consistent results over time.





Statistical Analysis



- Improve the measurement system: Identify the sources of variation that contribute to measurement error and implement improvements to reduce or eliminate these sources of variation.
- Some specific statistical techniques you can use in the analysis of errors in a measurement system include:
 - Analysis of variance (ANOVA): This technique can be used to determine the sources of variation in the measurements and to estimate the variability due to different sources.





Statistical Analysis



- Gage R&R analysis: This is a specific type of ANOVA that is used to evaluate the repeatability and reproducibility of a measurement system.
- Control charts: These are graphical tools that can be used to monitor the performance of a measurement system over time and to detect any changes or trends in the measurements.

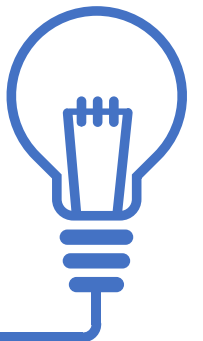




Statistical Analysis



- Capability analysis: This technique can be used to evaluate the capability of a measurement system to meet specific requirements or specifications.
- By following these steps and using appropriate statistical techniques, you can gain insight into the sources of error in a measurement system and make improvements to increase the accuracy, precision, and reliability of the system.





*Thank
you*

