COVARIANCE

DESCRIPTIVE STATISTICS

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TOPIC OUTLINE

Covariance

COVARIANCE

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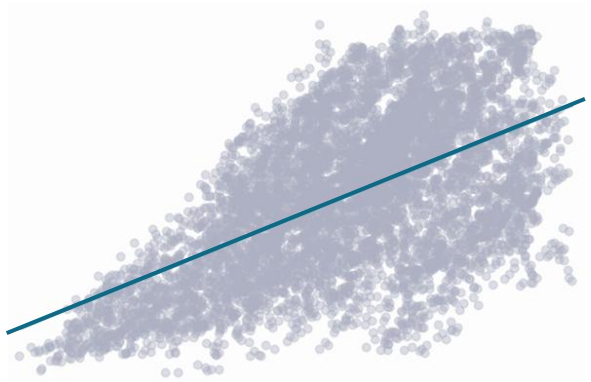
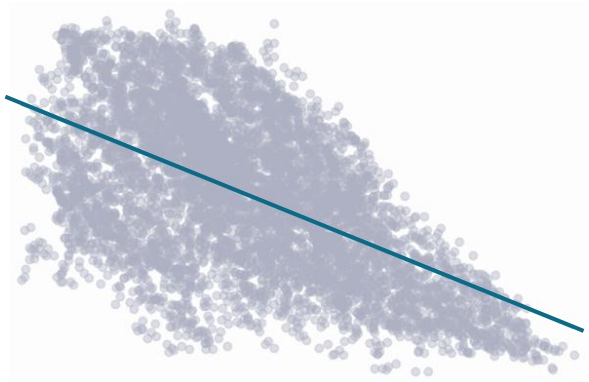
Covariance is a statistical measure that quantifies the **relationship** between two random variables $(\boldsymbol{X}, \boldsymbol{Y})$.

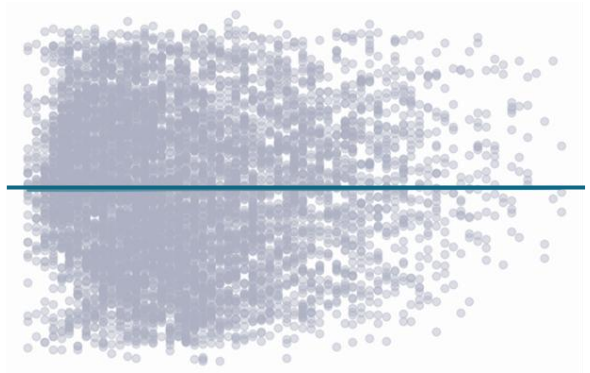
Scatter Plot:



Covariance > 0



Covariance < 0



Covariance = 0

COVARIANCE

Covariance is a statistical measure that quantifies the **relationship** between two random variables $(\boldsymbol{X}, \boldsymbol{Y})$.

Population Covariance:

$$\sigma_{xy} = \frac{\sum_{i=1}^{N}(x_i - \mu_x)(y_i - \mu_y)}{N}$$

Sample Covariance:

$$s_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{n-1}$$

EXERCISE

The given dataset contains five observations of current (A) and corresponding power (W) measurements. Does **current** and **power** consumption have a positive, negative, or no **linear relationship**?

Solution:

Device

Current	Power
2	100
3.5	200
1.8	90
4.2	210
2.7	110

LABORATORY