

Government Engineering College, Modasa
STTP on Optimization Techniques for Engineering Research
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Formulas:

$$\text{Mean: } m = \frac{1}{N} \sum_{i=1}^N X_i$$

$$\text{Variance: } \sigma^2 = \frac{1}{N-1} \sum_{i=1}^N (X_i - m)^2$$

$$\text{Euclidean Distance: } ED(A, B) = \sqrt{\sum_{i=1}^M \sum_{j=1}^N (A(i, j) - B(i, j))^2}$$

$$\text{Cross Correlation: } R(A, B) = \frac{\sum_{i=1}^M \sum_{j=1}^N (A(i, j) - \bar{A})(B(i, j) - \bar{B})}{\sqrt{\sum_{i=1}^M \sum_{j=1}^N (A(i, j) - \bar{A})^2} \sqrt{\sum_{i=1}^M \sum_{j=1}^N (B(i, j) - \bar{B})^2}}$$

Problems:

Given the following vectors:

$$A = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]$$

$$B = [4, 8, 12, 16, 20, 24, 28, 32, 36, 40]$$

$$C = [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]$$

Ex. 1: Find the arithmetic mean of vector A, B and C

Ex. 2: Find the variance of the vector A, B and C

Ex. 3: Find the euclidean distance between vector A and B

Ex. 4: Find the correlation between vectors A & B and A & C