

## 1 Introduction

The Standard Deviation is a measure of how spread out numbers are around the mean. It is denoted by Greek letter sigma  $\sigma$ . A low standard deviation implies that the data are grouped around the mean, whereas a large standard deviation shows that the data are more dispersed. In contrast, a high or low standard deviation indicates that the data points are, respectively, above or below the mean. A standard deviation that is close to zero implies that the data points are close to the mean.

$$(StandardDeviation) \quad \sigma = \sqrt{\frac{\sum(x - \bar{x})^2}{n}}$$

Where:

- $\sigma$  = Standard Deviation
- $n$  = Size of the population
- $x$  = each value from population
- $\bar{x}$  = Mean of the population

## 2 Domain and Co-Domain

**Domain:** Domain are the values which are given as input to the function. Hence in this case data values with natural and real numbers till infinity can be considered as domain.

**Co-Domain:** Co-Domain are the value which are given as output by the function. Therefore real numbers which are non negative and excluding imaginary numbers comes under Co-Domain.

## 3 Characteristics of Standard Deviation

- Only the spread or dispersion around a data set's mean is measured using the standard deviation.
- It can never be negative.
- The standard deviation is zero when all of the values in a data collection are the same because each value is equal to the mean.
- The higher the spread, the higher the standard deviation is for data with about the same mean.
- It is sensitive to outliers.

## References

- [1] [https://en.wikipedia.org/wiki/Standard\\_deviation](https://en.wikipedia.org/wiki/Standard_deviation)
- [2] <https://www.investopedia.com/terms/s/standarddeviation.asp>
- [3] [https://www.nlm.nih.gov/nichsr/stats\\_tutorial/section2/mod8\\_sd.html](https://www.nlm.nih.gov/nichsr/stats_tutorial/section2/mod8_sd.html)