

Statistics – Higher Central Moments



Skew and Kurtosis

Is the dispersion around the mean symmetric? “Fat Tails”?

Statistics – Higher Central Moments

A **central moment** is a moment of a **probability distribution** of a random variable about the random variable's mean.

- First Moment: **mean** (μ)
- Second Moment: **variance** / standard deviation (σ)
- Third Moment: **skew**(ness)
- Fourth Moment: **kurtosis**

Higher Central Moments – skew

The **skew**(ness) refers to the extent to which a distribution is not symmetrical.

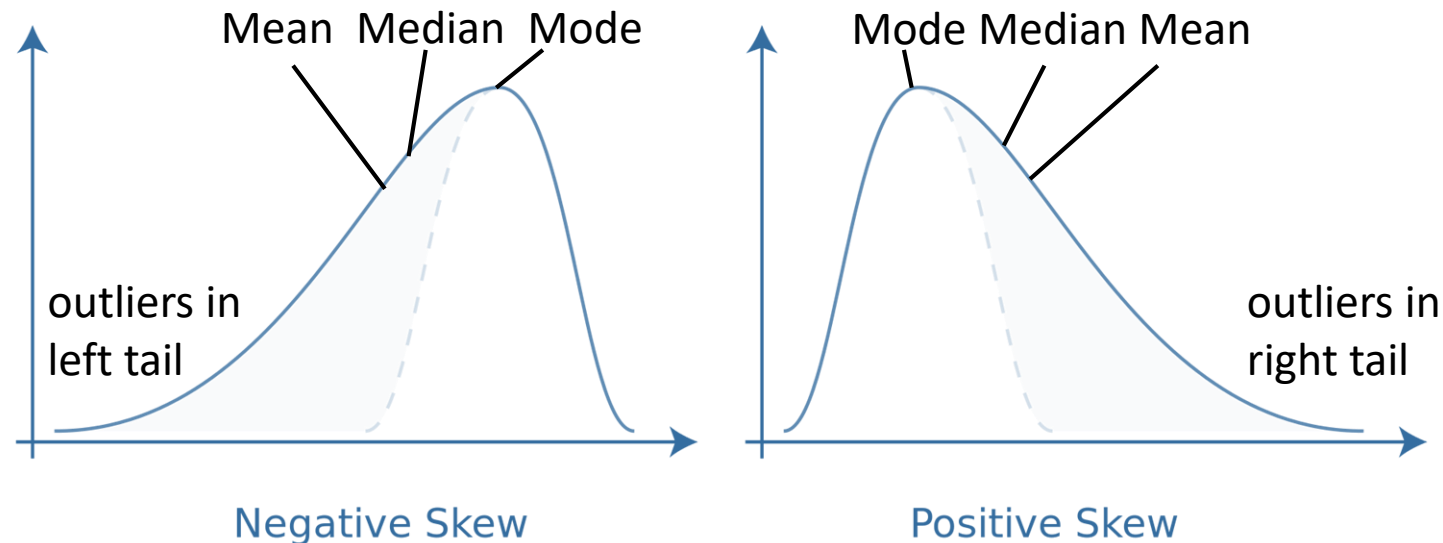
$$skew = \frac{1}{N} * \frac{\sum_{i=1}^N (X_i - \mu)^3}{\sigma^3}$$

σ : standard deviation

μ : mean

X_i : value of observation i

N : total number of observations



Higher Central Moments – kurtosis

kurtosis is a measure of the degree to which a distribution is less “peaked” with “fat tails”.

$$kurtosis = \frac{1}{N} * \frac{\sum_{i=1}^N (X_i - \mu)^4}{\sigma^4}$$

σ : standard deviation

μ : mean

X_i : value of observation i

N : total number of observations

