

## Excess kurtosis formula

The first feature of interest in a distribution is the mean. The second is the variance/standard deviation. The third is skewness, and this document is about the fourth, known as *kurtosis*.

Kurtosis measures the extent to which a distribution is outlier prone, with reference to a normal distribution.

The kurtosis for a normal distribution is exactly 3, so often kurtosis is reported as the “excess” over 3, and is known as *excess kurtosis*.

The formula for excess kurtosis of a set of numbers  $\{y_1, y_2, \dots, y_n\}$ , is:

$$\frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum_{i=1}^n \left\{ \left( \frac{y_i - \bar{y}}{s_y} \right)^4 \right\} - \frac{3(n-1)^2}{(n-2)(n-3)}.$$

In this formula  $n$  is the sample size,  $\bar{y}$  is the sample mean and  $s_y$  is the standard deviation of the sample.

It is the same definition as “ $G_2$ ” on the Wikipedia if you look it up.