# Binomial distribution

Expected Value

Proof:

Since X is sum of n identical Bernouli random variables, each expected value is p,

we have that

Variance

Proof:

PDF

where

n: number of trials k:number of success p:probability of success.

CDF

Mode

mode = if

mode = if

mode = if

Proof:

Let

For only

, we have that

While for other any value of p,

On the other hand,

For ,

Thus, when , we have that

From this follows,

=>

=>

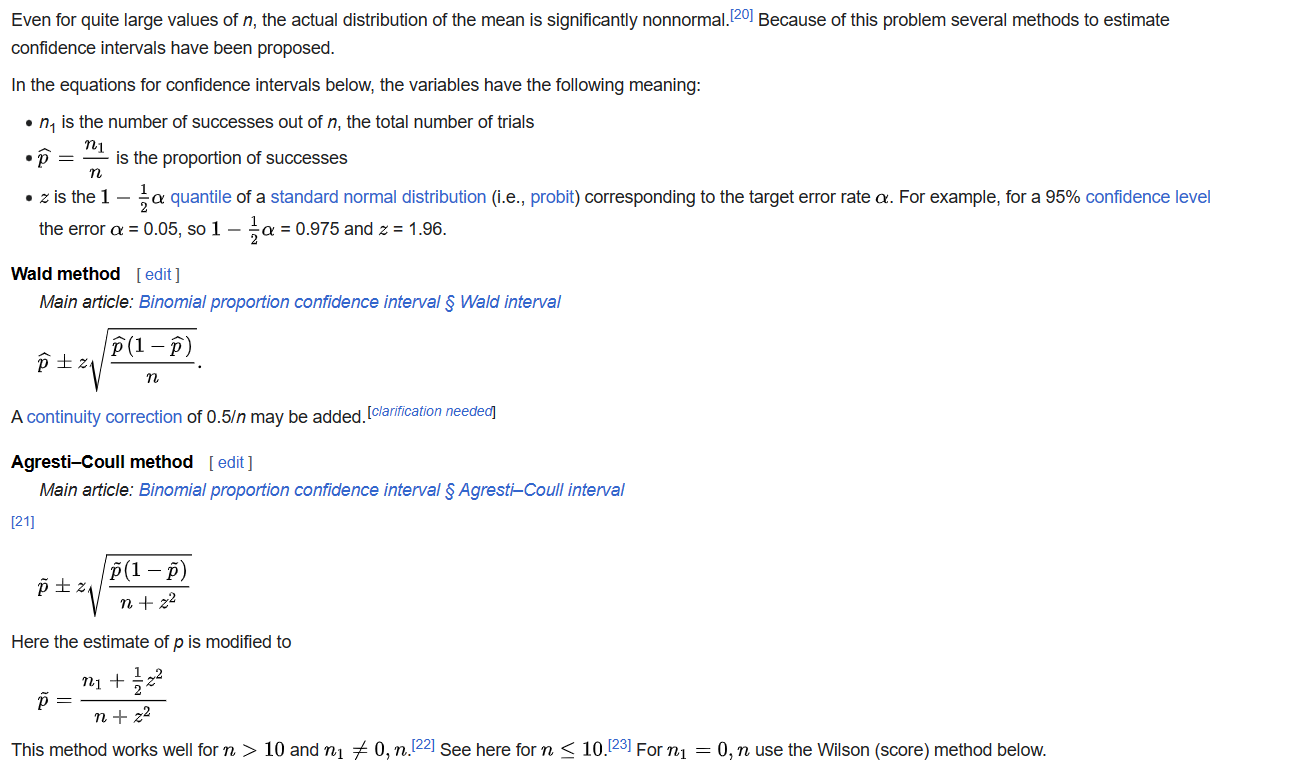
=>

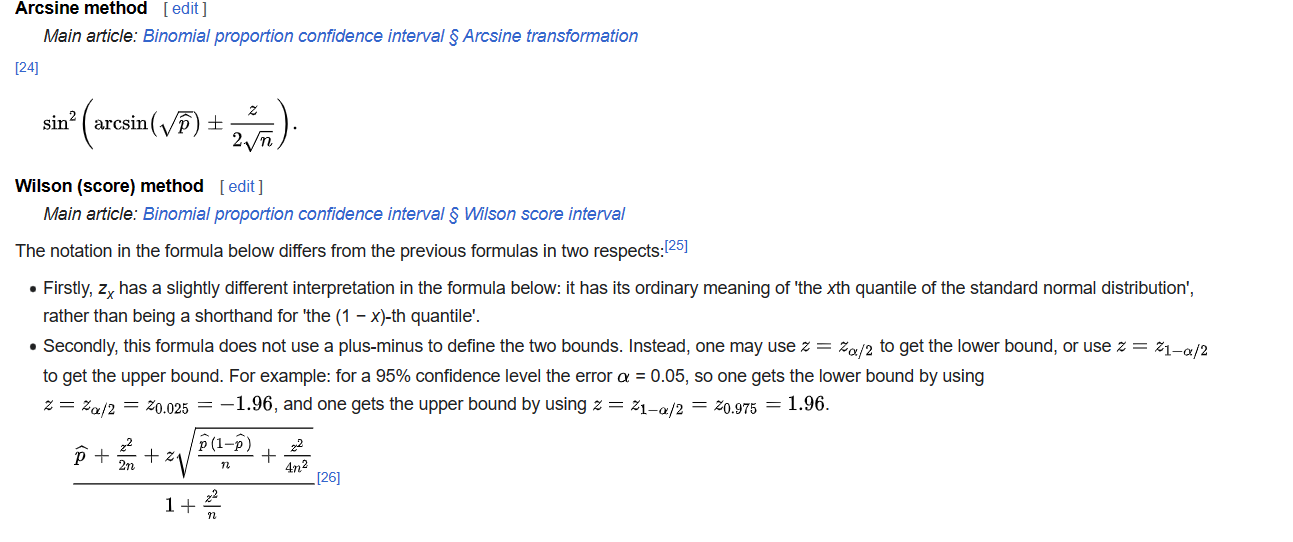
Median

If is integer, mean,mode,median

zss

Confidence Interval





Ref

For introduction, see wiki:

[Binomial distribution - Wikipedia](https://en.wikipedia.org/wiki/Binomial_distribution)

For proof, see statlect:

[Binomial distribution | Properties, proofs, exercises (statlect.com)](https://www.statlect.com/probability-distributions/binomial-distribution)