Portfolio III - Histograms & Distribution

Figure 1 shows histogram of trials until success, which I sampled from negative binomial distribution, with perimeters $r = 5$ and $p = 0.5$. The negative binomial distribution is described by:

$$P(X = k) = \binom{k + r - 1}{r - 1}(1 - p)^r p^k, \quad k \geq 0$$

where r is the number of successes and p the success probability.

In producing this plot I:

- Generated negative binomial random variables using Python's scipy's `scipy.stats.nbinom.rvs` and the above parameters using their documentation.[1]

- Constructed the histogram by resampling - using 50 samples, repeated 500 times.

- Calculated median estimates and 66% confidence intervals (lower = 17th percentile, upper = 83rd percentile).

We can see that the histogram's bar heights represent sample means (Median Estimate), so the histogram is a random variable because it reflects the distribution of repeated sampling.
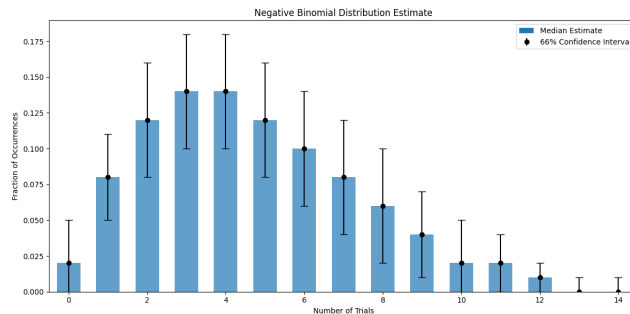

Figure 1: Histogram of trials until success for a negative binomial distribution. Error bars show 66% confidence intervals.

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[1] `https://docs.scipy.org/doc/scipy/reference/generated/scipy.stats.nbinom.html`