Explaining iscambinompower

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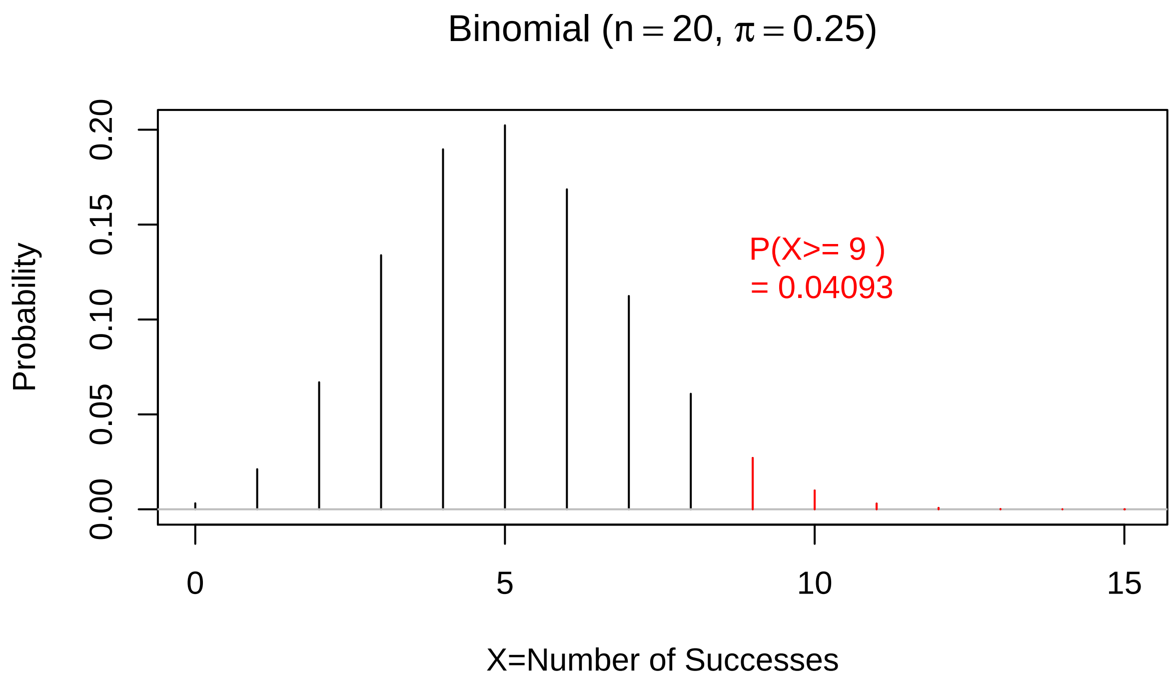
```r
# Source function
source('~/Senior Project/SP--Pablo--RProgramming/ISCAM2/R/iscambinompower.R', echo=TRUE)
```

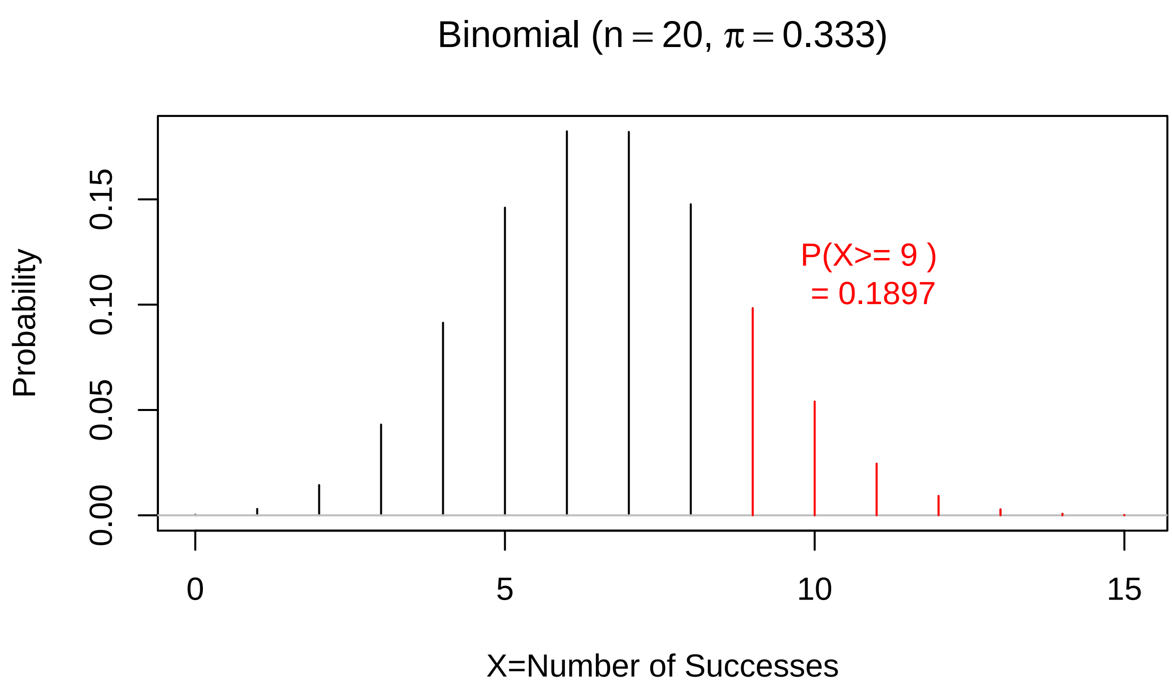
```
##
## > iscambinompower <- function(LOS, n, prob1, alternative,
## +     prob2 = NULL) {
## +     thisx = 0:max(n)
## +     minx = max(0, min(n * prob1 - 4 * sqrt(p .... [TRUNCATED]
```

Execute function

```r
iscambinompower(LOS = 0.05,
                n = 20,
                prob1 = 0.25,
                alternative = "greater",
                prob2 = 0.333)
```

```
## Probability 9 and above = 0.04092517
```






```
## Probability 9 and above = 0.1896621
```

Explain results

This execution has

- $\alpha = 0.05$
- $n = 20$
- H_0: $p = 0.25$ vs H_a: $p > 0.25$, where $p = 0.333$

The top graph shows the *rejection region*: that we would need to observe at least 9 successes in 20 trials in order to provide convincing evidence in favor of H_a, that p exceeds 0.25. If we observe 9 or more successes in 20 trials, our p-value for this test is 0.04093. (This computation **does not** depend on the value of $p = 0.333$.)

The bottom graph shows the *power* of the test. From the top figure, we already know that we would reject the null hypothesis if we observe at least 9 successes in 20 trials. Given that that $p = 0.333$, we now know that the probability that we would observe at least 9 successes in 20 trials (i.e., that we would correctly reject the null hypothesis) is 0.1897. (This computation **does** depend on the value of $p = 0.333$.)

Demo rejection region calculation

```r
options(scipen=999) # this option prevents scientific notation
check <- round(data.frame(x = 0:20,
                    prob1 = dbinom(0:20, 20, 0.25),
                    cum_prob1 = pbinom(0:20, 20, 0.25, lower.tail = F),
                    prob2 = dbinom(0:20, 20, 0.33),
                    cum_prob2 = pbinom(0:20, 20, 0.33, lower.tail = F)), 5)
check
```

```
##     x   prob1 cum_prob1   prob2 cum_prob2
## 1   0 0.00317   0.99683 0.00033   0.99967
## 2   1 0.02114   0.97569 0.00327   0.99639
## 3   2 0.06695   0.90874 0.01532   0.98108
## 4   3 0.13390   0.77484 0.04526   0.93582
## 5   4 0.18969   0.58516 0.09474   0.84108
## 6   5 0.20233   0.38283 0.14933   0.69175
## 7   6 0.16861   0.21422 0.18387   0.50788
## 8   7 0.11241   0.10181 0.18113   0.32675
## 9   8 0.06089   0.04093 0.14497   0.18178
## 10  9 0.02706   0.01386 0.09520   0.08658
## 11 10 0.00992   0.00394 0.05158   0.03500
## 12 11 0.00301   0.00094 0.02310   0.01190
## 13 12 0.00075   0.00018 0.00853   0.00337
## 14 13 0.00015   0.00003 0.00259   0.00078
## 15 14 0.00003   0.00000 0.00064   0.00015
## 16 15 0.00000   0.00000 0.00013   0.00002
## 17 16 0.00000   0.00000 0.00002   0.00000
## 18 17 0.00000   0.00000 0.00000   0.00000
## 19 18 0.00000   0.00000 0.00000   0.00000
## 20 19 0.00000   0.00000 0.00000   0.00000
## 21 20 0.00000   0.00000 0.00000   0.00000
```