

Hellenic Complex Systems Laboratory

# Exact Confidence Intervals for a Single Proportion

Technical Report XVI

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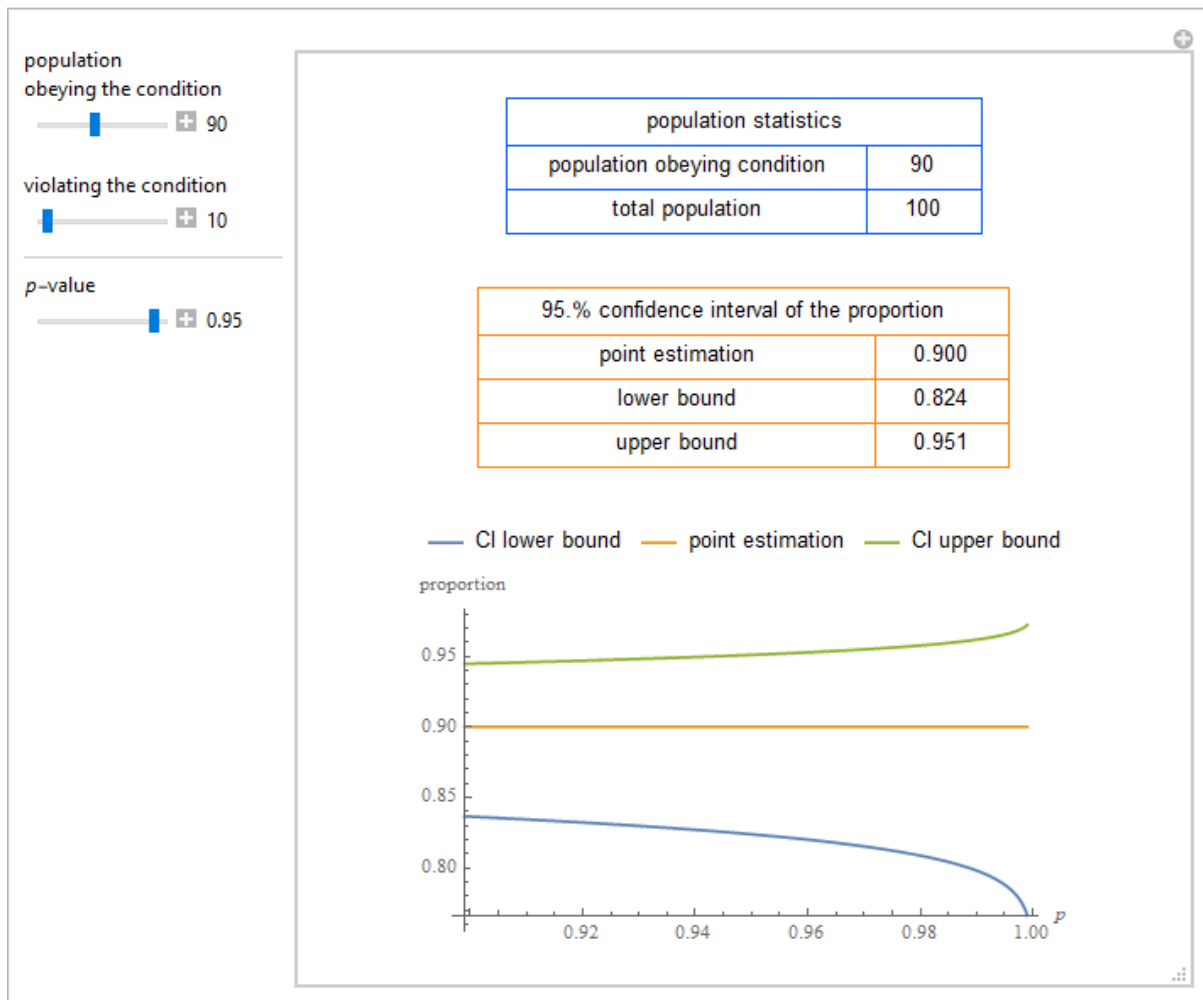
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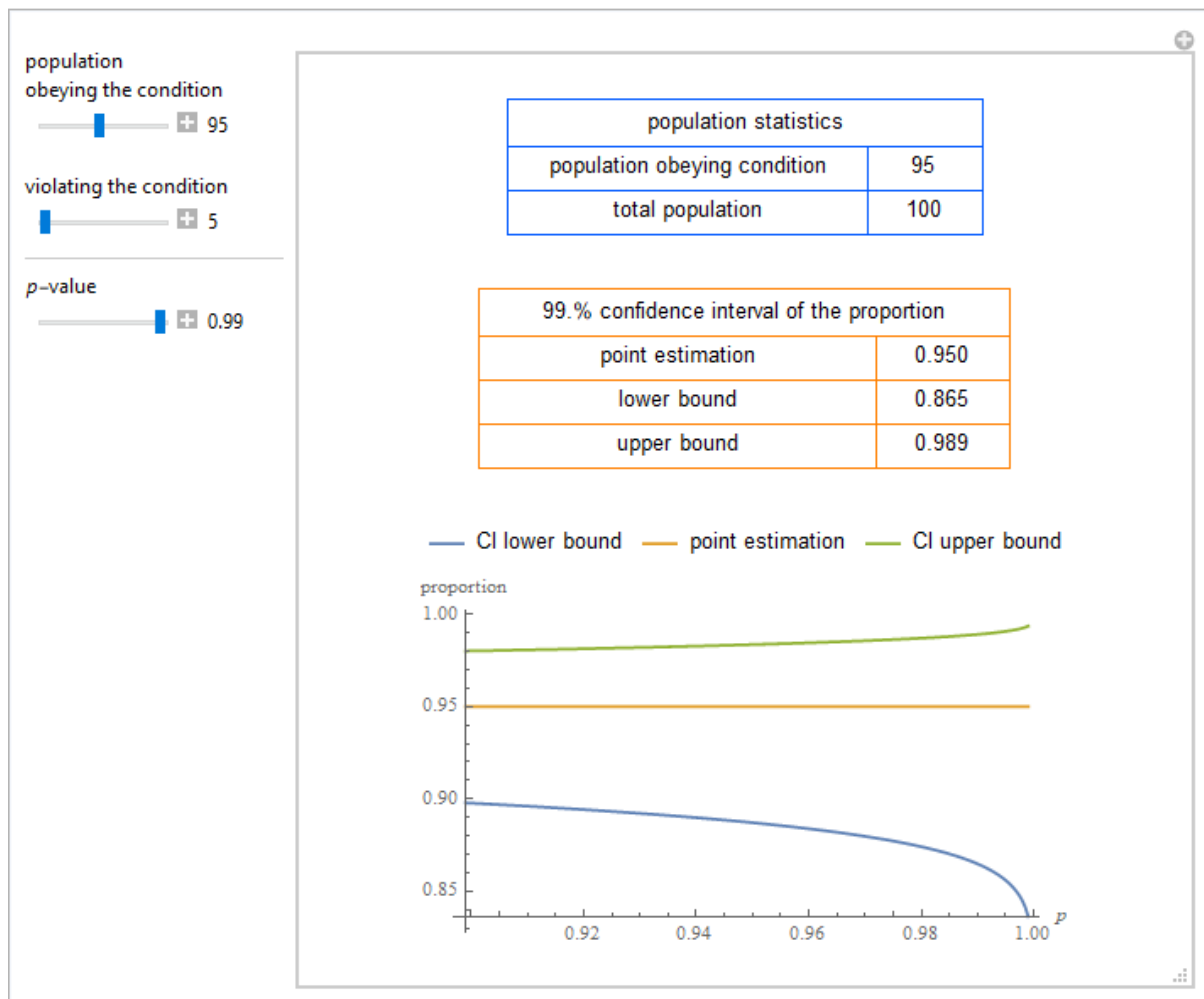
**Search Terms:** proportion, confidence interval, exact method,  $F$  distribution, inference

## Abstract

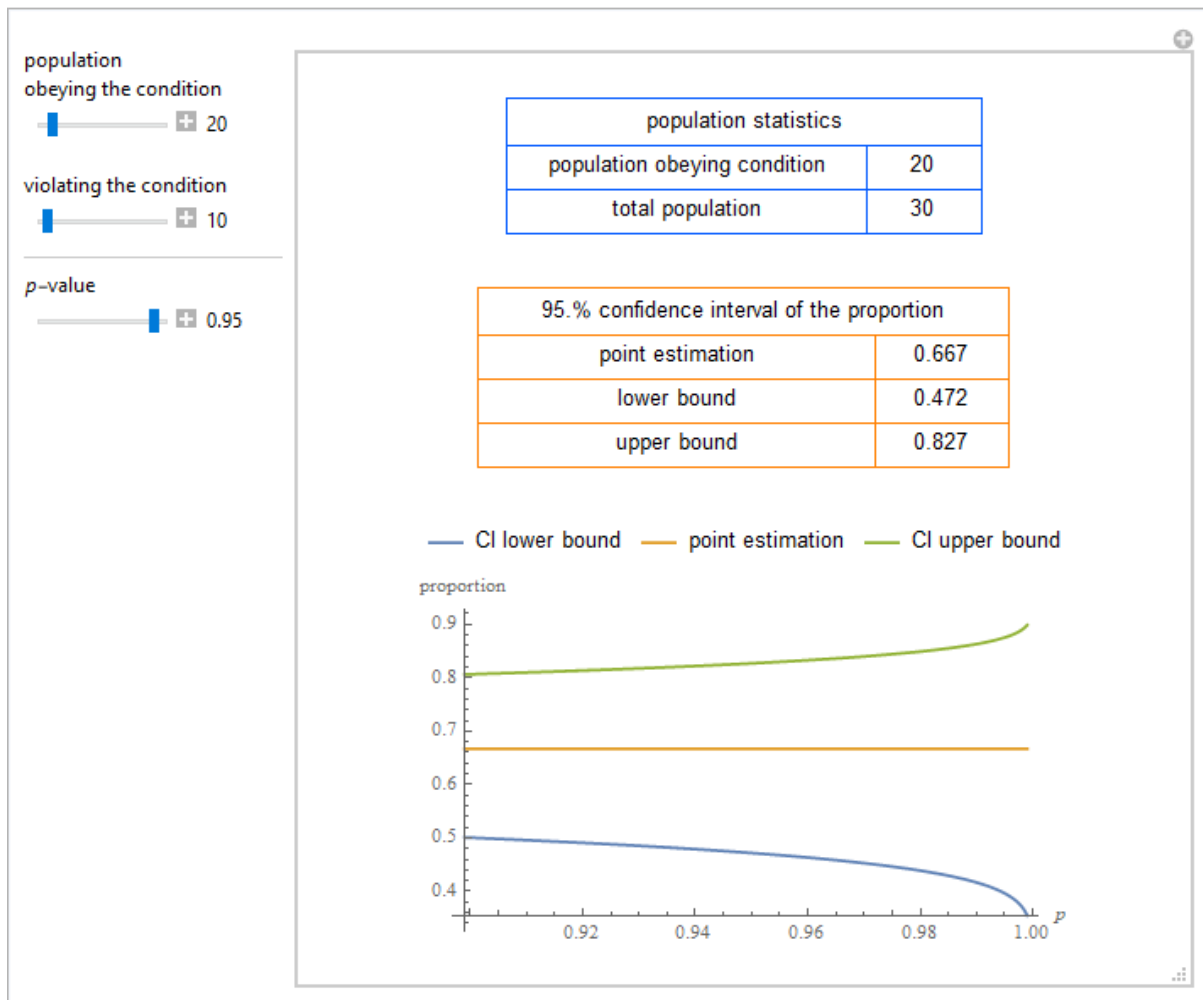
This Demonstration shows calculations of point estimations and confidence intervals for various single proportions of populations obeying a condition (or trait), as well as their plots versus  $p$ -value. This is done for differing populations obeying and violating a condition (or trait) and differing  $p$ -values for estimating the lower and upper bounds of the confidence intervals.



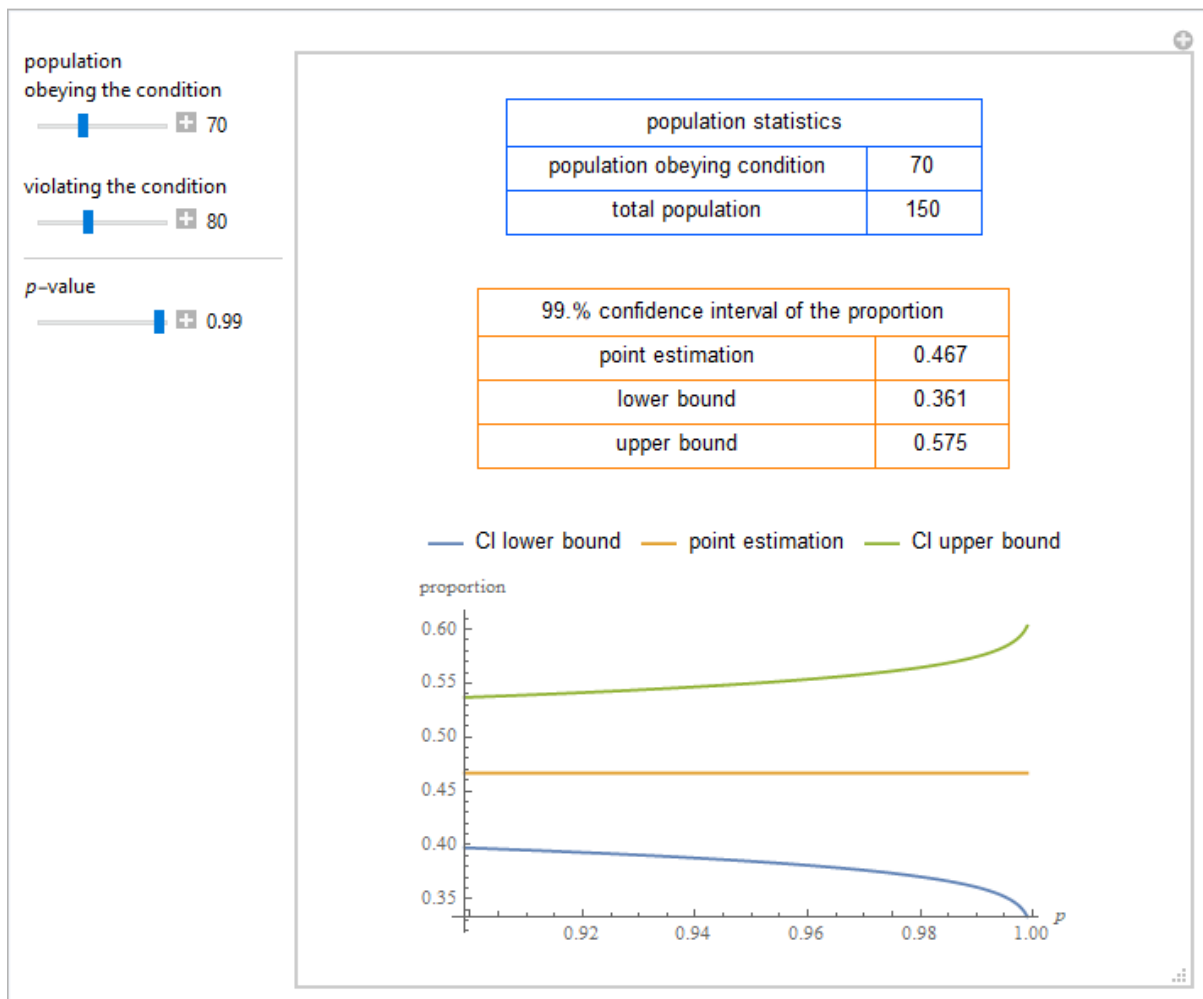
**Figure 1:** Population statistics, point estimation, and 95% confidence interval for a single proportion of a population obeying a condition, as well as their plots versus  $p$ -value. Population obeying and violating the condition: 90 and 10 respectively.



**Figure 2:** Population statistics, point estimation, and 99% confidence interval for a single proportion of a population obeying a condition, as well as their plots versus  $p$ -value. Population obeying and violating the condition: 95 and 5 respectively.



**Figure 3:** Population statistics, point estimation, and 95% confidence interval for a single proportion of a population obeying a condition, well as their plots versus  $p$ -value. Population obeying and violating the condition: 20 and 10 respectively.



**Figure 4:** Population statistics, point estimation, and 99% confidence interval for a single proportion of a population obeying a condition, as well as their plots versus  $p$ -value. Population obeying and violating the condition: 70 and 80 respectively.

## Details

The exact method using the  $F$ -distribution is applied for calculating the confidence interval of each single proportion [1].

## Reference

[1] J. L. Fleiss, B. Levin and M. C. Paik. Statistical Methods for Rates and Proportions, 3rd ed., Hoboken, NJ: J. Wiley, 2003.

## Source Code

The updated Wolfram Mathematica® source code is available at:

<https://www.hcsl.com/Tools/ExactConfidenceIntervalsForASingleProportion-author.nb>

## Permanent Citation:

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<http://demonstrations.wolfram.com/CalculationOfDiagnosticAccuracyMeasures/>

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