

## A goodness of fit test based on the median's characteristic function

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**Abstract.** The probability density function and characteristic function of the median are explored when drawing a sample from a population with uniform or exponential distribution. The convergence of the empirical characteristic function to the population characteristic function facilitates the construction of a goodness-of-fit test, quantifying the disparity between the empirical and population characteristic functions. Through the implementation of Monte Carlo simulations, a meticulous compilation of critical values is achieved, subsequently leading to a comprehensive power analysis concerning the goodness-of-fit tests. This analysis is particularly illuminating when contextualized within the realms of both uniform and exponential distributions. The outcomes gleaned from this thorough power analysis offer compelling insights, suggesting that goodness-of-fit tests grounded in the median's characteristic function exhibit superior performance when juxtaposed against certain alternative methodologies.[1]

**Keywords:** characteristic function, median, goodness of fit test, MATLAB, critical values

### References

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