# Math 362: Mathematical Statistics II

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# Chapter 14. Nonparametric Statistics

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# Nonparametric statistics

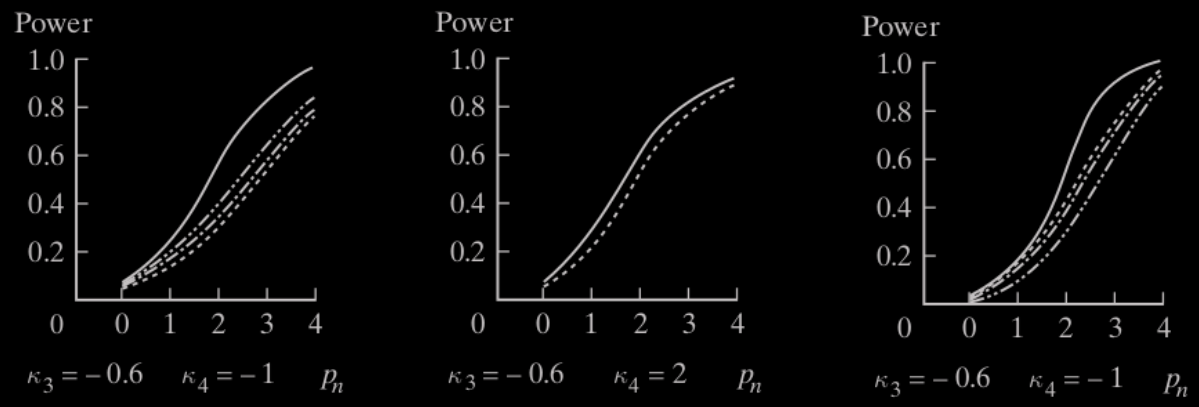
- *Distribution-free methods* : do not rely on assumptions that the data are drawn from a given parametric family of probability distributions.

- *Nonparametric statistics*: a statistic is defined to be a function on a sample and there is no dependency on any parameters, such as

  - *Order statistics*

# Nonparametric vs. Parametric methods

## – Power of Test




- Solid line: one-sample t-test (parametric test)
- Dashed lines: the sign test (nonparametric test)

# Nonparametric vs. Parametric methods

Nonparametric methods usually produce

- Greater variance in point estimation
- Less power in hypothesis-testing
- Wider confidence intervals
- Lower probability of correct selection (in ranking and selection)
- Higher risk (in decision theory)

Hence, use nonparametric methods only when

The underlying assumptions for the
probability distributions are seriously doubtful.