

## abstract

COMPUTER SCIENCE/DISCRETE MATH I

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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We introduce the notion of a Canonical Tester for a class of properties on distributions, that is, a tester strong and general enough that "a distribution property in the class is testable if and only if the Canonical Tester tests it". We construct a Canonical Tester for the class of symmetric properties of one or two distributions, satisfying a certain weak continuity condition. Analyzing the performance of the Canonical Tester on specific properties resolves several open problems, establishing lower bounds that match known upper bounds: we show that distinguishing between entropy  $<\alpha$  or  $>\beta$  on distributions over  $[n]$  requires  $n^{\{\alpha/\beta - o(1)\}}$  samples, and distinguishing whether a pair of distributions has statistical distance  $<\alpha$  or  $>\beta$  requires  $n^{1-o(1)}$  samples. Our techniques also resolve a conjecture about a property that our Canonical Tester does not apply to: distinguishing identical distributions from those with statistical distance  $>\beta$  requires  $\Omega(n^{\{2/3\}})$  samples.