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**Andrey Rukhin\*** ([andrey.rukhin@navy.mil](mailto:andrey.rukhin@navy.mil)), 18444 Frontage Road, Bldg. 1470, Suite 327, Room 2311, Dahlgren, VA 22448. *Invariant Theory for Hypothesis Testing on Graphs*.

Hypothesis testing on graphs has application in areas as diverse as connectome inference (wherein vertices are neurons or brain regions), social network analysis (wherein vertices represent individual actors or organizations), and text processing (wherein vertices represent authors or documents). Graph invariants are functions on graphs that do not depend on the particular labeling of the vertices and can be used as test statistics for deciding between a null versus an alternative model. However, even for simple models the exact distribution is unavailable for most invariants. Furthermore, comparative analyses of statistical power at some given Type I error rate for competing invariants, via both Monte Carlo and large sample approximation, demonstrate that simple settings can yield interesting comparative power phenomena.

In this talk the limiting null and alternative distributions for various invariants under various latent position models for attributed graphs [3] are derived, and power comparisons are performed using limit theory to provide large sample approximations. Monte Carlo analyses augment the limit theory. (Received August 31, 2011)