

**Stony Brook University  
The Graduate School**

Doctoral Defense Announcement

**Abstract**

**Application of Asymptotic LRTS Results to  
Mixture Problems in Genetic Research**

By

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This dissertation considers two mixture models. The first is a mixture model with known mixing proportions. The asymptotic null distribution of the likelihood ratio test statistic (LRTS) is calculated when the components are from a one parameter exponential family. The result is extended to the case in which the components include a nuisance parameter. This results are applied to an F-2 breeding experiment in genetic research. The second model is a mixture model with a known number of components in controls and cases where the component parameters are assumed to be equal. The null hypothesis is that there is equality of the mixing proportions. The LRTS for this hypothesis is presented, and the non-centrality parameter of the power function is derived. This LRTS is more powerful asymptotically than the test of independence, with increasing superiority as component frequency becomes small.

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