



## Statistics Seminar Series

Session 1, 2007



---

**Lester Tsang**

PhD student, School of Mathematics and Statistics  
The University of New South Wales

### **Bootstrapping linear models: comparison of different resampling methods**

The bootstrap is a computationally intensive statistical technique which is generally applicable to many practical problems. However, there are many different ways to apply the bootstrap, and these have different properties. Currently in the literature, a framework for bootstrapping has not yet been established for generalized linear models (GLM's), and to a lesser extent, for hypothesis testing in linear models (i.e. there is no established set of "rules" describing which bootstrap method is optimal for each situation). The overall aim of my thesis is to provide such a framework for GLM's, and apply it in a few different settings. This seminar describes the first step towards such a framework - an examination of the behaviour of bootstrap-based hypothesis testing of *linear models*.

We consider both a theoretical and a simulation-based approach. Our simulation results in general tend to agree with those predicted by theory and current literature. We will also present two novel results. Firstly, for residual resampling, the use of residuals from the null model has better properties than the use of residuals from the full model, in terms of maintaining accurate Type I error levels. Secondly, for case and score resampling, we consider the question of whether to use the "sandwich" variance estimator or the "naive" variance estimator in order for tests to have more accurate size.

**About the speaker:** Lester Tsang is a PhD student in the School of Mathematics and Statistics at UNSW. He is supervised by David Warton and Sally Galbraith.

**Time:** 4pm, Friday, 30th March

**Location:** Room 4082, Red Centre

Please join us after the seminar for wine and cheese in the staffroom.

Seminar co-ordinator: Sally Galbraith  
e-mail: [Sally.Galbraith@unsw.edu.au](mailto:Sally.Galbraith@unsw.edu.au)