**Excursion 4 Tour IV: More Auditing: Objectivity and Model Checking**

While all models are false, it's also the case that no useful models are true. Were a model so complex as to represent data realistically, it wouldn't be useful for finding things out. A statistical model is useful by being *adequate for a problem, meaning* it enables controlling and assessing if purported solutions are well or poorly probed and to what degree. We give a way to define severity in terms of solving a problem.(4.8) When it comes to testing model assumptions, many Bayesians agree with George Box (1983) that "it requires frequentist theory of significance tests" (p. 57). Tests of model assumptions, also called misspecification (M-S) tests, are thus a promising area for Bayes-frequentist collaboration. (4.9) When the model is in doubt, the likelihood principle is inapplicable or violated. We illustrate a non-parametric bootstrap resampling. It works without relying on a theoretical probability distribution, but it still has assumptions. (4.10). We turn to the M-S testing approach of econometrician Aris Spanos.(4.11) I present the high points for unearthing spurious correlations, and assumptions of linear regression, employing 7 figures. M-S tests differ importantly from model selection–the latter uses a criterion for choosing among models, but does not test their statistical assumptions. They test fit rather than whether a model has captured the systematic information in the data.

**Keywords**

adequacy for a problem, severity (in terms of problem solving), model testing/misspecification (M-S) tests, likelihood principle conflicts, bootstrap, resampling, Bayesian p-value, central limit theorem, nonsense regression, significance tests in model checking, probabilistic reduction, respecification