1172-62-36 **Sarah K Alver***, salver@unm.edu, and **Guoyi Zhang**. *Parametric Bootstrap Approach to Multi-Factor ANOVA w/Unequal Variances and Unbalanced Data.* Preliminary report.

The issue of unmet equal variance assumption in multi-factor ANOVA has been addressed in the literature with several methods, and parametric bootstrap (PB) has been found in the one-way and two-way cases to outperform other methods. We extend the PB procedures to the multi-factor case and illustrate with a three-way ANOVA model with unequal group variances (heteANOVA model). We develop a framework for working with these models, analogous to usual multi-factor ANOVA procedures, where F-tests and multiple comparison procedures are replaced by PB procedures. Using simulation, we compare these methods to F-tests for each step in model selection, as well as to Tukey's test and Dunnett's test for multiple comparison procedures (MCP). The results of our simulations indicate that the PB methods outperform F-tests, Tukey's test and Dunnett's test in terms of Type I error when data are unbalanced. (Received August 09, 2021)