***A validation of limo\_robust\_rep\_ANOVA.m***

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# Repeated measures ANOVA using limo\_rep\_ANOVA

limo\_rep\_ANOVA.m computes repeated measures ANOVAs. Unlike standard ANOVAs, we use a multivariate framework which accounts for the correlation across measures. One advantage of this approach is that one does not have to account for sphericity and it is therefore more powerful in the heteroscedastic case. In short we either run a Hotelling T2 on the repeated measures or a MANOVA, that is a generalized T2, on transformed data. The code implements equations described in: Rencher (2002) Methods of multivariate analysis. John Wiley Eds.

limo\_robust\_rep\_ANOVA.m replicates computations of limo\_rep\_ANOVA using variations on the code to accommodate winsorized variances and trimmed data. To test those functions, simulated data were created and outputs from SPSS are compared to our functions.

## Code validation

### Case 1: 1 factor

1 factor with 3 levels – data follow a multivariate normal distribution.

## Case 2: several factors

## Case 3: groups \* 1 factor

## Case 4: groups \* several factors

1. Type 1 error rate

The same data as in (1) were used to estimate the type 1 error. In each case data were generated N times and centered. The average number of positive results is the type 1 error rate

1. Efficacy

The goal here is not to estimate the power of limo\_robust\_rep\_ANOVA.m but to establish it’s efficacy against limo\_rep\_ANOVA.m. The same data as in (1) were generated and the two codes compared, that is testing 0% vs. 20% trimming. In a second test, a few outliers were added and the 2 codes compared again.