

A Brief Document for *ama*

This document describes the commands available in `ama.R`.

1. **Behrens**: Performs Behrens test for equality of two mean vectors

- input:
 - `x1` and `x2`: two data matrices for population 1 and 2.
- output: Test statistic and its p-value

2. **BoxM**: Perform Box test for equal covariance matrices of multiple populations

- input:
 - `x`: data matrix (n-by-p) with n observations and p variables
 - `nv`: a vector of sample sizes for each population (`n1`, `n2`, ...). The first `n1` rows of data are for population 1, data from (`n1`+1) to (`n1`+`n2`) are for population 2, etc.
- output:
 - `Box.M`: contains the test statistics and their p-values
 - `Test.Stat`: test statistics
 - `p.value`: p values

3. **BoxCox**: Obtain the Box-Cox power transformation

- input:
 - `da`: data matrix
 - `interval`: The interval for which lambda is to be computed.
- output: estimate of the power of transformation

4. **classify56**: Classification using Equation (11.56) of the textbook.

- input:
 - `da`: data matrix
 - `size`: a vector of sample sizes of the populations (`n1`,`n2`,...,`ng`) with `n1` being the observations from population 1, etc.
 - `eqP`: switch for prior equal probabilities, default is TRUE

- pr: prior probabilities if not equal.
 - newdata: new data to test the efficiency of classification. If newdata = NULL, then the original data (da) is used to perform in-sample classification.
 - output: results of classification for the new data.
5. **Cmeans**: compare mean vectors of two populations
- input:
 - da: data matrix (one population on top of the other)
 - size: two-dimensional vector of sample sizes
 - eqV: indicator for equal covariance matrices. Default is TRUE
 - alpha: tail probability
 - output: various summary and test statistics. Also, confidence interval for difference of the two means.
6. **confreg**: compute various confidence regions for a mean vector
- input:
 - da: data matrix
 - alpha: tail probability, default is 0.05.
 - length: indicator for computing lengths of confidence intervals.
 - output: five types of confidence intervals (simultaneous, T^2 , individual t, Bonferroni, and asymptotic)
7. **contrast**: For a given contrast matrix, compute Hotelling test and confidence intervals.
- input:
 - da: data matrix
 - cmtx: contrast matrix
 - output: results of test and confidence intervals.
8. **confreg.s**: Same as confreg but inputs are sample mean and covariance matrix, not data
- input:

- sm: sample mean
 - s: sample covariance matrix
 - nr: sample size
 - alpha: tail probability, default is 0.05.
 - output: See confreg command.
9. **discrim**: perform discriminant analysis
- input:
 - da: data matrix
 - size: vector of sample sizes for all populations
 - eqP: indicator for equal prior probabilities, default is TRUE
 - eqV: indicator for equal covariance matrices, default is TRUE
 - newdata: new data matrix for discrimination, default is NULL.
 - output: results of discriminant analysis and classification for new data, if any.
10. **eigTest**: perform chi-square test for no correlations
- input:
 - Sigma: covariance matrix
 - p, q: dimensions of each vector (X and Y)
 - n: sample size
 - output
 - values: eigenvalues
 - Xvectors: xcoef matrix
 - Yvectors: ycoef matrix
11. **EMmiss**: perform EM to fill missing values
- input:
 - da: data matrix
 - fix: matrix of indicator for missing values. $\text{fix}[\text{imj}] = 0$ means missing
 - iter: number of iterations
 - output: resulting sample mean and covariance

12. **growth**: Growth curve analysis

- input:
 - da: data matrix
 - nv: vector of sample sizes of the groups
 - tp: time vector
 - q: order of time polynomial
- output: print of results

13. **Hotelling**: perform Hotelling test

- input:
 - da: data matrix
 - mu: mean vector under the null hypothesis
- output: results of the test

14. **qqchi2**: perform QQ-plot

- input:
 - da: data matrix
- output: QQ-plot

15. **t2chart**: compute t2 control chart

- input:
 - da: data matrix
- output: plot

16. **t2future**: compute t2 future chart

- input:
 - da: data matrix
 - ini: starting point to compute future chart
- output: plot