README

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multicmp

multicmp is a toolkit for flexible modeling of multivariate count data, especially in the presence of data dispersion. Currently the package only supports bivariate data. Future development will extend the package to higher-dimensional data.

[The two uses are for hypothesis testing of under/over-dispersion and parameter estimation?]

To use multicmp, one will first need to install the following two packages:

```
  install.packages("numDeriv")
  install.packages("stats")
```

One can install the latest released version of multicmp from CRAN with:

```
  install.packages("multicmp")
```

Using multicmp

To get started with multicmp right away, read the notes below. For a more detailed and technical description of the bivariate COMPoisson distribution, see Sellers et al. (2016).

The multicmp package houses the *accidents* data set (Arbous and Kerrich, 1951)

```
xy <- read.table("BivariateAccidentData.txt", header = T)

source('R/dbivcmp.r')
source('R/suma.r')
source('R/pbivpois.R')
source('R/simple.bp.R')
source('R/ComputeConstantBCMPests.R', echo=TRUE)
```

```
##
## > ComputeConstantBCMPests <- function(data, max, startvalues = NULL) {
## +     if (dim(data)[2] != 2) {
## +         stop("data must have 2 columns")
## +     .... [TRUNCATED]
```

```
ComputeConstantBCMPests(xy, 20)
```

```
## Iterating...
##   0:     417.40419:  1.00000  1.00000 0.250000 0.250000 0.250000 0.250000
##  10:     341.96921:  1.39944 0.565067 0.0578931  1.23610 0.941546 0.0837704
##  20:     341.80170:  1.34091 0.478084 0.297249  1.24706 0.936665 0.0832811
##  30:     341.74503:  1.71379 0.347011  2.27704 0.752317 0.557157 0.0548687
##  40:     341.71363:  1.61970 0.299108  2.25919 0.662409 0.499085 0.0394690
##
##  The parameter estimates are as follows:
##   Parameter        MLE SE
## 1    lambda 1.62281361  ?
```

```
## 2        nu 0.29950875  ?
## 3       p00 0.65422712  ?
## 4       p10 0.19051429  ?
## 5       p01 0.14354532  ?
## 6       p11 0.01171327  ?
##
##  Hypothesis test results:
##   Likelihood.ratio.test     p.value
## 1               7.84313 0.005101421
## $par
## [1] 1.62281361 0.29950875 0.65422712 0.19051429 0.14354532 0.01171327
##
## $negll
## [1] 341.7135
##
## $LRT_bpd
## [1] 7.84313
##
## $p_bpd
## [1] 0.005101421
```