README

ddd

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multicmp

multicmp is a toolkit containing statistical analysis models motivated by multivariate forms of the Conway-Maxwell-Poisson (COM-Poisson) distribution for flexible modeling of multivariate count data, especially in the presence of data dispersion, via the bivariate COM-Poisson distribution described in Sellers et al. (2016). Currently the package only supports bivariate data. Future development will extend the package to higher-dimensional data.

Note that multicmp references *bivpois* package (Karlis and Ntzoufras).

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, see the parameter estimation below. For a more detailed and technical description of the bivariate COM-Poisson distribution, see Sellers et al. (2016).

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

```
## Warning: package 'numDeriv' was built under R version 3.3.2
```

```
  data(accidents)
```

```
multicmpests(accidents)
```

```
## Iterating...
##   0:     417.40419:  1.00000  1.00000 0.250000 0.250000 0.250000 0.250000
##  10:     341.96921:  1.39943 0.565066 0.0578914  1.23610 0.941546 0.0837680
##  20:     341.80172:  1.33949 0.478530 0.291067  1.24676 0.936406 0.0832219
##  30:     341.75624:  1.73148 0.298489  2.48243 0.541393 0.404226 0.0401858
##  40:     341.72985:  1.58546 0.184560  2.62036 0.250584 0.188284 0.0178609
##  50:     341.70970:  1.36510 0.0937936  2.39008 0.0933674 0.0697459 0.00637300
##  60:     341.70384:  1.32843 0.0838565  2.32231 0.0836417 0.0629114 0.00561440
##
##  The parameter estimates ($par) are as follows:
##  Parameter        MLE
##     lambda 1.32843718
##         nu 0.08385902
##        p00 0.93850333
##        p10 0.03380274
##        p01 0.02542472
##        p11 0.00226921
##
```

```
##  Log-likelihood ($negll): 341.7038
##
##  Dispersion hypothesis test statistic ($LRTbpd) and p-value ($pbpd):
##  Likelihood.ratio.test     p.value
##               7.862468 0.005047146
```