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.

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)

```
  data(accidents)
```

```
ComputeConstantBCMPests(accidents, 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
```

```
## Warning in sqrt(diag(solve(H))): NaNs produced
```

```
##
##  The parameter estimates ($par) and standard errors ($se) are as follows:
##   Parameter        MLE        SE
## 1    lambda 1.62281361 0.4423275
## 2        nu 0.29950875 0.2032192
## 3       p00 0.65422712       NaN
## 4       p10 0.19051429       NaN
## 5       p01 0.14354532       NaN
## 6       p11 0.01171327       NaN
##
##  Log-likelihood ($negll): 341.7135
##
##  Dispersion hypothesis test statistic ($LRT_bpd) and p-value ($p_bpd):
```

```
##   Likelihood.ratio.test     p.value
## 1               7.84313 0.005101421
```