

Package: zoidtmb (via r-universe)

November 26, 2024

Title Zero-and-One Inflated Dirichlet Regression Modelling in TMB

Version 1.3.0

Description Fits Dirichlet regression and zero-and-one inflated Dirichlet regression with Bayesian methods implemented in Stan. These models are sometimes referred to as trinomial mixture models; covariates and overdispersion can optionally be included.

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URL <https://nwfsc-cb.github.io/zoidtmb/>,
<https://github.com/nwfsc-cb/zoidtmb/issues>

Depends R (>= 4.0.0)

Imports gtools, stats, TMB (>= 1.7.20), Rcpp

Suggests testthat, knitr, rmarkdown

LinkingTo RcppEigen, TMB

VignetteBuilder knitr

ByteCompile true

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.2.3

SystemRequirements GNU make

Config/pak/sysreqs make

Repository <https://nmfs-opensci.r-universe.dev>

RemoteUrl <https://github.com/noaa-nwfsc/zoidtmb>

RemoteRef HEAD

RemoteSha 8a89ca33e28f6589224add236821920873453b54

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broken_stick	<i>Random generation of datasets using the dirichlet broken stick method</i>
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Description

Random generation of datasets using the dirichlet broken stick method

Usage

```
broken_stick(
  n_obs = 1000,
  n_groups = 10,
  ess_fraction = 1,
  tot_n = 100,
  p = NULL
)
```

Arguments

n_obs	Number of observations (rows of data matrix to simulate). Defaults to 10
n_groups	Number of categories for each observation (columns of data matrix). Defaults to 10
ess_fraction	The effective sample size fraction, defaults to 1
tot_n	The total sample size to simulate for each observation. This is approximate and the actual simulated sample size will be slightly smaller. Defaults to 100
p	The stock proportions to simulate from, as a vector. Optional, and when not included, random draws from the dirichlet are used

Value

A 2-element list, whose 1st element X_{obs} is the simulated dataset, and whose 2nd element is the underlying vector of proportions p used to generate the data

Examples

```

y <- broken_stick(n_obs = 3, n_groups = 5, tot_n = 100)

# add custom proportions
y <- broken_stick(
  n_obs = 3, n_groups = 5, tot_n = 100,
  p = c(0.1, 0.2, 0.3, 0.2, 0.2)
)

```

chinook	<i>Data from Satterthwaite, W.H., Ciancio, J., Crandall, E., Palmer-Zwahlen, M.L., Grover, A.M., O'Farrell, M.R., Anson, E.C., Mohr, M.S. & Garza, J.C. (2015). Stock composition and ocean spatial distribution from California recreational chinook salmon fisheries using genetic stock identification. Fisheries Research, 170, 166–178. The data genetic data collected from port-based sampling of recreationally-landed Chinook salmon in California from 1998-2002.</i>
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Usage

```
chinook
```

Format

A data frame.

coddiet	<i>Data from Magnussen, E. 2011. Food and feeding habits of cod (Gadus morhua) on the Faroe Bank. – ICES Journal of Marine Science, 68: 1909–1917. The data here are Table 3 from the paper, with sample proportions (columns w) multiplied by total weight to yield total grams (g) for each sample-diet item combination. Dashes have been replaced with 0s.</i>
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Usage

```
coddiet
```

Format

A data frame.

```
fit_zoidTMB
```

Fit a trinomial mixture model with TMB

Description

Fit a trinomial mixture model that optionally includes covariates to estimate effects of factor or continuous variables on proportions.

Usage

```
fit_zoidTMB(
  formula = NULL,
  design_matrix,
  data_matrix,
  overdispersion = FALSE,
  overdispersion_sd = 5,
  prior_sd = NA
)
```

Arguments

formula	The model formula for the design matrix. Does not need to have a response specified. If =NULL, then the design matrix is ignored and all rows are treated as replicates
design_matrix	A data frame, dimensioned as number of observations, and covariates in columns
data_matrix	A matrix, with observations on rows and number of groups across columns
overdispersion	Whether or not to include overdispersion parameter, defaults to FALSE
overdispersion_sd	Prior standard deviation on 1/overdispersion parameter, Defaults to inv-Cauchy(0,5)
prior_sd	Optional prior sd / penalty for fixed effects

Examples

```
# fit a model with 1 factor
#design <- data.frame("fac" = c("spring", "spring", "fall"))
#fit <- fit_zoidTMB(formula = ~fac, design_matrix = design, data_matrix = y)
```

parse_re_formula	<i>Fit a trinomial mixture model that optionally includes covariates to estimate effects of factor or continuous variables on proportions.</i>
------------------	--

Description

Fit a trinomial mixture model that optionally includes covariates to estimate effects of factor or continuous variables on proportions.

Usage

```
parse_re_formula(formula, data)
```

Arguments

formula	The model formula for the design matrix.
data	The data matrix used to construct RE design matrix

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