

Package ‘ghcclm’

August 8, 2026

Type Package

Title Generalized Hybrid Contrast Coding in Linear Models

Version 0.1.0

Description Implements generalized hybrid contrast coding methods for K-level categorical predictors in linear models as established by Obulezi (2026)[cite: 3]. The package automates design matrix construction mixing dummy indicators and composite group contrasts, checks rank constraints via singular value decomposition, computes closed-form OLS parameter mappings, and estimates robust heteroscedastic covariance matrices[cite: 3].

License MIT + file LICENSE

Encoding UTF-8

Depends R (>= 4.0.0)

Imports stats

Suggests testthat (>= 3.0.0)

Config/roxygen2/version 8.0.0

NeedsCompilation no

Author Okechukwu J. Obulezi [aut, cre]

Maintainer Okechukwu J. Obulezi <oj.obulezi@unizik.edu.ng>

Repository CRAN

Date/Publication 2026-08-08 13:00:06 UTC

Contents

build_ghc_matrix	2
ghc_lm	2
Index	4

build_ghc_matrix	<i>Generate Generalized Hybrid Design Matrix</i>
------------------	--

Description

Constructs a non-orthogonal, full-rank hybrid design matrix for qualitative factors with $K \geq 3$ levels, combining dummy indicator columns with composite simple contrast vectors.

Usage

```
build_ghc_matrix(K, n, tol = 1e-12)
```

Arguments

K	Positive integer. Total number of factor levels ($K \geq 3$).
n	Integer vector of length K giving sub-sample sizes per group.
tol	Numeric tolerance threshold for SVD singular values to verify rank.

Value

A numeric design matrix of size $N \times K$ (where $N = \text{sum}(n)$) with class attribute "ghc_matrix" and matrix attribute "C_operator".

Examples

```
XH <- build_ghc_matrix(K = 3, n = c(10, 10, 10))
attr(XH, "condition_number")
```

ghc_lm	<i>Fit Linear Models via Generalized Hybrid Contrast Coding</i>
--------	---

Description

Computes linear regression parameters using analytical hybrid contrast mappings. Provides theoretical variance-covariance estimators under both homoscedasticity and heteroscedasticity.

Usage

```
ghc_lm(formula, data, robust = FALSE)
```

Arguments

formula	Object of class "formula" representing model structure.
data	Data frame containing continuous response and categorical predictor.
robust	Logical. If TRUE, computes Huber-White sandwich variance.

Value

An S3 object of class "ghc_lm" containing fitted metrics.

Examples

```
set.seed(123)
dat <- data.frame(
  group = factor(rep(1:3, each = 10)),
  y = rnorm(30, mean = 50, sd = 5)
)
mod <- ghc_lm(y ~ group, data = dat)
summary(mod)
```

Index

`build_ghc_matrix`, [2](#)

`ghc_lm`, [2](#)