

# Package ‘melt’

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**Type** Package

**Title** Multiple Empirical Likelihood Tests

**Version** 1.1.0

**Description** Empirical likelihood-based multiple testing for the analysis of experimental designs.  
Details of the testing procedures are given in Kim et al. (2021) <[arxiv:2112.09206](https://arxiv.org/abs/2112.09206)>.

**URL** <https://github.com/markean/melt>

**BugReports** <https://github.com/markean/melt/issues>

**License** GPL (>= 2)

**Depends** R (>= 3.5.0)

**Imports** Rcpp (>= 1.0.6), stats

**LinkingTo** Rcpp, RcppEigen, RcppProgress

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.1.2

**NeedsCompilation** yes

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**Repository** CRAN

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clothianidin	<i>Clothianidin concentration in maize plants</i>
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### Description

A dataset summarizing field experiments result of seed treatments on clothianidin concentration.

### Usage

```
data("clothianidin")
```

### Format

A data frame with 102 rows and 3 variables:

**blk** New blocks constructed from original data. The format is 'days post planting\_original block\_year'.

**trt** Seed treatment.

**clo** Log transformed clothianidin concentration ( $\mu\text{g}$ ).

### Details

The original data is provided by Alford and Krupke (2017). Only some of the shoot region observations are taken from the original data and processed for illustration.

### Source

Alford A, Krupke CH (2017) Translocation of the neonicotinoid seed treatment clothianidin in maize. PLoS ONE 12(3): e0173836. doi: [10.1371/journal.pone.0173836](https://doi.org/10.1371/journal.pone.0173836)

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el_aov	<i>Fit an Analysis of Variance Model via Empirical Likelihood</i>
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### Description

Fit an one-way analysis of variance model via empirical likelihood.

### Usage

```
el_aov(formula, data, maxit = 10000, abstol = 1e-08)
```

### Arguments

formula	A formula object. It must specify variables for response and treatment as 'response ~ treatment'.
data	A data frame containing the variables in the formula.
maxit	Maximum number of iterations for optimization. Defaults to 10000.
abstol	Absolute convergence tolerance for optimization. Defaults to 1e-08.

**Value**

A list with class `c("el_aov", "melt")`.

**References**

Owen, A. B. (1988), "Empirical Likelihood for Linear Models," *The Annals of Statistics*, 1725–1747.

**See Also**

[el\\_test](#)

**Examples**

```
el_aov(clo ~ trt, clothianidin)
```

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el_mean	<i>Empirical likelihood test for mean</i>
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**Description**

Computes empirical likelihood for mean parameter.

**Usage**

```
el_mean(theta, x, maxit = 50L, abstol = 1e-08)
```

**Arguments**

theta	Numeric vector of parameters to be tested.
x	Numeric matrix or vector of data. If x is a matrix, each row corresponds to an observation.
maxit	Maximum number of iterations for optimization. Defaults to 50.
abstol	Absolute convergence tolerance for optimization. Defaults to 1e-08.

**Value**

A list with class `c("mean", "melt")`.

**References**

Owen, A. B. (1988), "Empirical Likelihood for Linear Models," *The Annals of Statistics*, 1725–1747.

**Examples**

```
## scalar mean
theta <- 0
x <- rnorm(100)
el_mean(theta, x)

## vector mean
x <- matrix(rnorm(100), ncol = 2)
theta <- c(0, 0)
el_mean(theta, x)
```

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el\_pairwise

*Empirical likelihood pairwise comparisons*


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**Description**

Tests all pairwise comparisons or comparisons with control for general block designs. Two single step asymptotic  $k$ -FWER (generalized family-wise error rate) controlling procedures are available: asymptotic Monte Carlo (AMC) and nonparametric bootstrap (NB).

**Usage**

```
el_pairwise(
  formula,
  data,
  control = NULL,
  k = 1,
  alpha = 0.05,
  method = c("AMC", "NB"),
  B,
  nthread = 1,
  progress = TRUE,
  maxit = 10000,
  abstol = 1e-08
)
```

**Arguments**

formula	A formula object. It must specify variables for response, treatment, and block as 'response ~ treatment   block'. Note that the use of vertical bar ( ) separating treatment and block.
data	A data frame containing the variables in the formula.
control	Optional character specifying the treatment for comparisons with control.
k	Single integer for $k$ in $k$ -FWER. Defaults to 1.
alpha	Level of the test. Defaults to 0.05.

method	Single character for the procedure to be used; either 'AMC' or 'NB' is supported. Defaults to 'AMC'.
B	Number of Monte Carlo samples for the AMC (number of bootstrap replicates for the NB).
nthread	Number of threads to be used with OpenMP. Only applied when the NB is chosen as the method. Defaults to 1.
progress	If TRUE, will show progress status.
maxit	Maximum number of iterations for optimization. Defaults to 10000.
abstol	Absolute convergence tolerance for optimization. Defaults to 1e-08.

**Value**

A list with class `c("pairwise", "melt")`.

**References**

Kim, E., MacEachern, S., and Peruggia, M., (2021), "Empirical Likelihood for the Analysis of Experimental Designs," [arxiv:2112.09206](https://arxiv.org/abs/2112.09206).

**Examples**

```
## all pairwise comparisons
el_pairwise(clo ~ trt | blk, clothianidin, B = 10000)

## comparisons with control
el_pairwise(clo ~ trt | blk, clothianidin, control = "Naked", method = "NB", B = 1000)
```

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el\_test

*Empirical likelihood hypothesis testing*


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**Description**

Tests single hypothesis for general block designs.

**Usage**

```
el_test(formula, data, lhs, rhs = NULL, maxit = 10000, abstol = 1e-08)
```

**Arguments**

formula	A formula object. It must specify variables for response, treatment, and block as 'response ~ treatment   block'. Note that the use of vertical bar ( ) separating treatment and block.
data	A data frame containing the variables in the formula.
lhs	Numeric matrix specifying linear hypothesis in terms of parameters.



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