

# Package ‘wdm’

May 8, 2026

**Title** Weighted Dependence Measures

**Version** 0.2.6

**Description** Provides efficient implementations of weighted dependence measures and related asymptotic tests for independence. Implemented measures are the Pearson correlation, Spearman's rho, Kendall's tau, Blomqvist's beta, and Hoeffding's D; see, e.g., Nelsen (2006) <[doi:10.1007/0-387-28678-0](https://doi.org/10.1007/0-387-28678-0)> and Hollander et al. (2015, ISBN:9780470387375).

**Depends** R (>= 3.2.0)

**License** MIT + file LICENSE

**Encoding** UTF-8

**LinkingTo** Rcpp

**Imports** Rcpp

**RoxygenNote** 7.3.2

**URL** <https://github.com/tnagler/wdm-r>

**BugReports** <https://github.com/tnagler/wdm-r/issues>

**Suggests** testthat, Hmisc, copula, covr

**NeedsCompilation** yes

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**Repository** CRAN

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wdm-package

*Weighted Dependence Measures*

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### Description

Provides efficient implementations of weighted dependence measures and related asymptotic tests for independence. Implemented measures are the Pearson correlation, Spearman's rho, Kendall's tau, Blomqvist's beta, and Hoeffding's D; see, e.g., Nelsen (2006) <doi:10.1007/0-387-28678-0> and Hollander et al. (2015, ISBN:9780470387375).

### Details

The DESCRIPTION file: This package was not yet installed at build time.

### Author(s)

**Maintainer:** Thomas Nagler <mail@tnagler.com>

### See Also

Useful links:

- <https://github.com/tnagler/wdm-r>
- Report bugs at <https://github.com/tnagler/wdm-r/issues>

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indep\_test

*Independence Tests for Weighted Dependence Measures*

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### Description

Computes a (possibly weighted) dependence measure between  $x$  and  $y$  if these are vectors. If  $x$  and  $y$  are matrices then the measure between the columns of  $x$  and the columns of  $y$  are computed.

### Usage

```
indep_test(  
  x,  
  y,  
  method = "pearson",  
  weights = NULL,  
  remove_missing = TRUE,  
  alternative = "two-sided"  
)
```

**Arguments**

<code>x, y</code>	numeric vectors of data values. <code>x</code> and <code>y</code> must have the same length.
<code>method</code>	the dependence measure; see <i>Details</i> for possible values.
<code>weights</code>	an optional vector of weights for the observations.
<code>remove_missing</code>	if TRUE, all (pairwise) incomplete observations are removed; if FALSE, the function throws an error if there are incomplete observations.
<code>alternative</code>	indicates the alternative hypothesis and must be one of "two-sided", "greater" or "less". You can specify just the initial letter. "greater" corresponds to positive association, "less" to negative association.

**Details**

Available methods:

- "pearson": Pearson correlation
- "spearman": Spearman's  $\rho$
- "kendall": Kendall's  $\tau$
- "blomqvist": Blomqvist's  $\beta$
- "hoeffding": Hoeffding's  $D$

Partial matching of method names is enabled. All methods except "hoeffding" work with discrete variables.

**Examples**

```
x <- rnorm(100)
y <- rpois(100, 1) # all but Hoeffding's D can handle ties
w <- runif(100)

indep_test(x, y, method = "kendall")           # unweighted
indep_test(x, y, method = "kendall", weights = w) # weighted
```

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rank\_wtd

*Computing weighted ranks*


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**Description**

The weighted rank of  $X_i$  among  $X_1, \dots, X_n$  with weights  $w_1, \dots, w_n$  is defined as

$$\frac{1}{n} \sum_{j=1}^n w_j 1[X_j \leq X_i].$$

**Usage**

```
rank_wtd(x, weights = numeric(), ties_method = "average")
```

**Arguments**

<code>x</code>	a numeric vector.
<code>weights</code>	a vector of weights (same length as <code>x</code> ).
<code>ties_method</code>	Indicates how to treat ties; same as in R, see <a href="https://stat.ethz.ch/R-manual/R-devel/library/base/html/rank.html">https://stat.ethz.ch/R-manual/R-devel/library/base/html/rank.html</a> .

**Value**

a vector of ranks.

**Examples**

```
x <- rnorm(100)
w <- rexp(100)
rank(x)
rank_wtd(x, w)
```

---

wdm

*Weighted Dependence Measures*


---

**Description**

Computes a (possibly weighted) dependence measure between `x` and `y` if these are vectors. If `x` and `y` are matrices then the measure between the columns of `x` and the columns of `y` are computed.

**Usage**

```
wdm(x, y = NULL, method = "pearson", weights = NULL, remove_missing = TRUE)
```

**Arguments**

<code>x</code>	a numeric vector, matrix or data frame.
<code>y</code>	NULL (default) or a vector, matrix or data frame with compatible dimensions to <code>x</code> . The default is equivalent to ‘ <code>y = x</code> ’ (but more efficient).
<code>method</code>	the dependence measure; see <i>Details</i> for possible values.
<code>weights</code>	an optional vector of weights for the observations.
<code>remove_missing</code>	if TRUE, all (pairwise) incomplete observations are removed; if FALSE, the function throws an error if there are incomplete observations.

## Details

Available methods:

- "pearson": Pearson correlation
- "spearman": Spearman's  $\rho$
- "kendall": Kendall's  $\tau$
- "blomqvist": Blomqvist's  $\beta$
- "hoeffding": Hoeffding's  $D$  Partial matching of method names is enabled.

Spearman's  $\rho$  and Kendall's  $\tau$  are corrected for ties if there are any.

## Examples

```
## dependence between two vectors
x <- rnorm(100)
y <- rpois(100, 1) # all but Hoeffding's D can handle ties
w <- runif(100)
wdm(x, y, method = "kendall")           # unweighted
wdm(x, y, method = "kendall", weights = w) # weighted

## dependence in a matrix
x <- matrix(rnorm(100 * 3), 100, 3)
wdm(x, method = "spearman")           # unweighted
wdm(x, method = "spearman", weights = w) # weighted

## dependence between columns of two matrices
y <- matrix(rnorm(100 * 2), 100, 2)
wdm(x, y, method = "hoeffding")       # unweighted
wdm(x, y, method = "hoeffding", weights = w) # weighted
```

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