

# Package ‘SIT’

October 16, 2024

**Title** Association Measurement Through Sliced Independence Test (SIT)

**Version** 0.1.1

**Description** Computes the sit coefficient between two vectors  $x$  and  $y$ , possibly all paired coefficients for a matrix. The reference for the methods implemented here is Zhang, Yilin, Canyi Chen, and Liping Zhu. 2022. "Sliced Independence Test." *Statistica Sinica*. <[doi:10.5705/ss.202021.0203](https://doi.org/10.5705/ss.202021.0203)>.

This package incorporates the Galton peas example.

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**Encoding** UTF-8

**RoxygenNote** 7.2.3

**LinkingTo** Rcpp, RcppArmadillo

**Imports** Rcpp, stats

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**Suggests** ggplot2, psychTools

**URL** <https://github.com/canyi-chen/SIT>

**BugReports** <https://github.com/canyi-chen/SIT/issues>

**NeedsCompilation** yes

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blocksum                      *Compute the block-wise sum of a vector.*

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**Description**

Compute the block-wise sum of a vector.

**Usage**

```
blocksum(r, c)
```

**Arguments**

r                      An integer vector  
c                      The number of observations in each block

**Value**

The function returns the block sum of the vector.

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calculateSIT                      *Compute the cross rank coefficient sit on two vectors.*

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**Description**

This function computes the sit coefficient between two vectors x and y.

**Usage**

```
calculateSIT(x, y, c = 2)
```

**Arguments**

x                      Vector of numeric values in the first coordinate.  
y                      Vector of numeric values in the second coordinate.  
c                      The number of observations in each slice.

**Value**

The function returns the value of the sit coefficient.

**Note**

Auxiliary function with no checks for NA, etc.

**Author(s)**

Yilin Zhang, Canyi Chen & Liping Zhu

**References**

Zhang Y., Chen C., & Zhu L. (2021). Sliced Independence Test. *Statistica Sinica*. <https://doi.org/10.5705/ss.202021.0203>.

**See Also**

sitcor

**Examples**

```
# Compute one of the coefficients
library("psychTools")
data(peas)
calculateSIT(peas$parent,peas$child)
calculateSIT(peas$child,peas$parent)
```

---

sitcor

*Conduct the sliced independence test.*

---

**Description**

This function computes the sit coefficient between two vectors x and y, possibly all paired coefficients for a matrix.

**Usage**

```
sitcor(
  x,
  y = NULL,
  c = 2,
  pvalue = FALSE,
  ties = FALSE,
  method = "asymptotic",
  nperm = 199,
  factor = FALSE
)
```

**Arguments**

x	Vector of numeric values in the first coordinate.
y	Vector of numeric values in the second coordinate.
c	The number of observations in each slice.
pvalue	Whether or not to return the p-value of rejecting independence, if TRUE the function also returns the standard deviation of sit.

ties	Do we need to handle ties? If ties=TRUE the algorithm assumes that the data has ties and employs the more elaborated theory for calculating s.d. and P-value. Otherwise, it uses the simpler theory. There is no harm in putting ties = TRUE even if there are no ties.
method	If method = "asymptotic" the function returns P-values computed by the asymptotic theory (not available in the presence of ties). If method = "permutation", a permutation test with nperm permutations is employed to estimate the P-value. Usually, there is no need for the permutation test. The asymptotic theory is good enough.
nperm	In the case of a permutation test, nperm is the number of permutations to do.
factor	Whether to transform integers into factors, the default is to leave them alone.

### Value

In the case pvalue=FALSE, function returns the value of the sit coefficient, if the input is a matrix, a matrix of coefficients is returned. In the case pvalue=TRUE is chosen, the function returns a list:

**sitcor** The value of the sit coefficient.

**sd** The standard deviation.

**pval** The test p-value.

### Author(s)

Yilin Zhang, Canyi Chen & Liping Zhu

### References

Zhang Y., Chen C., & Zhu L. (2022). Sliced Independence Test. *Statistica Sinica*. <https://doi.org/10.5705/ss.202021.0203>.

### Examples

```
##---- Should be DIRECTLY executable !! ----
library("psychTools")
data(peas)
# Visualize      the peas data
library(ggplot2)
ggplot(peas,aes(parent,child)) +
geom_count() + scale_radius(range=c(0,5)) +
      xlim(c(13.5,24))+ylim(c(13.5,24))+      coord_fixed() +
      theme(legend.position="bottom")
# Compute one of the coefficients
sitcor(peas$parent,peas$child, c = 4, pvalue=TRUE)
sitcor(peas$child,peas$parent, c = 4)
# Compute all the coefficients
sitcor(peas, c = 4)
```

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