Package 'scoredec'

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Type Package

Title S-Core Graph Decomposition

Version 0.1.0

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Description S-Core Graph Decomposition algorithm for graphs. This is a method for decomposition of a weighted graph, as proposed by Eidsaa and Almaas (2013) <doi:10.1103/PhysRevE.88.062819>. The high speed and the low memory usage make it suitable for large graphs.

License GPL-3

LinkingTo Rcpp

Encoding UTF-8

URL https://github.com/cadam00/scoredec, https://cadam00.github.io/scoredec/

BugReports https://github.com/cadam00/scoredec/issues

Imports Rcpp (>= 1.0.12), Rfast, igraph

Suggests knitr, rmarkdown, testthat (>= 3.0.0)

Config/testthat/edition 3

RoxygenNote 7.3.2

VignetteBuilder knitr, rmarkdown

NeedsCompilation yes

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Repository CRAN

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Contents

`s_coreness` *s-core community decomposition*

Description

s-core community decomposition

Usage

```
s_coreness(g = NULL, W = NULL, mode = "all")
```

Arguments

`g`	`igraph` object. It is a weighted graph. If it is not weighted, then the `igraph::coreness` function will be used. It can be used as an alternative to `W`.
`W`	`matrix` object. It is an adjacency matrix. It can be used as an alternative to `g`.
`mode`	`character` object. It can be one of `"all"`, `"in"` or `"out"`.

Details

s-core community decomposition implementation. Only one of `g` or `W` must be provided.

While the source code is not as clear as the one at `brainGraph::s_core`, it is very speed and memory efficient. In case that the adjacency matrix `W` is provided instead of the graph `g` is provided, then this function is very speed and memory efficient.

Note that in cases that the adjacency matrix `W` is known to be symmetric (checked, for example, with `base::isSymmetric` or `Rfast::is.symmetric`), then `mode = "in"` and `mode = "out"` will produce the same result more efficiently. For efficiency reasons not checking it is chosen, but user should do it.

Value

Integer vector with s-coreness attribute to each vertex.

References

Eidsaa, M. and Almaas, E. (2013) 's-core network decomposition: A generalization of k-core analysis to weighted networks', *Phys. Rev. E.*, American Physical Society, **88**, 062819. doi:10.1103/PhysRevE.88.062819.

Watson, C.G. (2024). brainGraph: Graph Theory Analysis of Brain MRI Data. R package version 3.1.0. doi:10.32614/CRAN.package.brainGraph.

Examples

```
set.seed(42)

# Create a dummy symmetric adjacency matrix
n <- 5
W <- matrix(runif(n^2),n)
W[lower.tri(W)] = t(W)[lower.tri(W)]
diag(W) <- 0

print(scoredec::s_coreness(g = NULL, W = W, mode = "all"))
## [1] 3 1 2 4 4

base::isSymmetric(W)
## [1] TRUE

all.equal(scoredec::s_coreness(g = NULL, W = W, mode = "all"),
scoredec::s_coreness(g = NULL, W = W, mode = "in"))
## [1] TRUE

# Create a dummy undirected graph
g <- igraph::graph_from_adjacency_matrix(adjmatrix = W,
                                         mode      = "undirected",
                                         weighted  = TRUE)
print(scoredec::s_coreness(g = g, W = NULL, mode = "all"))
## [1] 3 1 2 4 4
```

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