Package 'xtranat'

March 27, 2023

Type Package

Title Network Metrics Based on Random Walks

Version 0.1.0

Description

There are two new network metrics, RWC (random walk centrality) and CBET (counting betweenness). Also available are the normalized versions of those metrics. These measures of centrality and betweenness are particularly useful for the analysis of very dense weighted networks which include loops. Traditional measures do not work as well for those network characteristics. The main reference is DePaolis at al (2022) <doi:10.1007/s41109-022-00519-2>.

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.2.3

Suggests knitr, rmarkdown, igraph, kableExtra, testthat (>= 3.0.0)

Config/testthat/edition 3

VignetteBuilder knitr

Depends R (>= 2.10)

URL https://github.com/fdepaolis/xtranat

BugReports https://github.com/fdepaolis/xtranat/issues

NeedsCompilation no

Author Fernando DePaolis [aut, cre] (<https://orcid.org/0000-0003-2296-8381>)

Maintainer Fernando DePaolis <fdepaolis@middlebury.edu>

Repository CRAN

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R topics documented:

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cbet   *Computes Counting Betweenness*

Description

Counting Betweenness implemented as in DePaolis et al(2022)

Usage

```
cbet(A)
```

Arguments

A   The adjacency matrix of the network to be analyzed. It must be square.

Value

The vector containing the values of Counting Betweenness of the network..

Examples

```
cbet(exmpl_matrix)
```

---

cbet_norm   *Computes Counting Betweenness in normalized format*

Description

A normalized version of Counting Betweenness implemented as in DePaolis et al(2022)

Usage

```
cbet_norm(A)
```

Arguments

A   The adjacency matrix of the network to be analyzed.It must be square.

Value

The vector containing the normalized values (between 0 and 1) of Counting Betweenness of the network.

Examples

```
cbet_norm(exmpl_matrix)
```

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exmpl_matrix *Data to showcase the functions in the xtranat package*

Description

Contains a randomly created adjacency matrix

Usage

```
exmpl_matrix
```

Format

A 10 by 10 square matrix

Details

It is a 10 by 10 matrix with some values in the diagonal to represent loops

Source

Created by the author as an example

Examples

```
data(exmpl_matrix)
```

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mfpt   *Computes mfpt*

Description

mean first-passage time implemented as in DePaolis et al(2022)

Usage

```
mfpt(A)
```

Arguments

A   The adjacency matrix of the network to be analyzed

Value

mfpt.

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rwc   *Computes Random Walk Centrality*

Description

Random Walk Centrality implemented as in DePaolis et al(2022)

Usage

```
rwc(A)
```

Arguments

A   The adjacency matrix of the network to be analyzed.It must be square.

Value

The vector containing the values of Random Walk Centrality of the network.

Examples

```
rwc(exmpl_matrix)
```

---

rwc_norm *Computes Random Walk Centrality in normalized format*

Description

A normalized version of Random Walk Centrality implemented as in DePaolis et al(2022)

Usage

```
rwc_norm(A)
```

Arguments

A   The adjacency matrix of the network to be analyzed.It must be square.

Value

The vector containing the normalized values (between 0 and 1) of Random Walk Centrality of the network.

Examples

```
rwc_norm(exmpl_matrix)
```

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