

Package ‘sdcn’

February 15, 2015

Type Package

Title Structures and Dynamics on (of) Complex Networks (sdcn)

Version 0.0.0.9000

Date 2015-02-05

Author Wenfeng Feng

Maintainer Wenfeng Feng <fengwenfeng@gmail.com>

Description The package intends to implement general simulation of dynamics on (of) networks which have different structural features. The current goal is to simulate ecological interactions among species in ecological networks, as the first instance of complex networks.

Modules should include:

- 1) Dynamic models. Holling Type I, II dynamic models should be implemented for mutualistic networks, food webs, competitive networks, and mixed networks.
- 2) Environmental Perturbations. Two types of perturbations: continuously pressed env. and repeated pulsed env. (stochastics). The perturbations can effect not only on (all or part of) species(nodes) but also on (all or part of) interactions(links).
- 3) Null models of different structural features such as degree heterogeneity and modularity.
- 4) Analysis of simulation results.
- 5) Fit of empirical data?

Imports deSolve (>= 1.10-8),
simecol (>= 0.8-4),
rootSolve (>= 1.6.5)

License What license is it under?

Suggests knitr

VignetteBuilder knitr

R topics documented:

model.lv2	2
sdcn	2
swaplinks	3

Index	4
--------------	----------

<code>model.lv2</code>	<i>Lotka-Volterra (LV) Equations of Holling type II by Bastolla et al. for mutualistic communities</i>
------------------------	--

Description

Lotka-Volterra (LV) Equations of Holling type II by Bastolla et al. for mutualistic communities

Usage

```
model.lv2(time, init, parms, ...)
```

Arguments

<code>time</code> ,	time step of simulation
<code>init</code> ,	the initial state of the LV system, a vector
<code>parms</code>	parameters passed to LV model <code>r</code> , the intrinsic growth rate of species, a vector <code>C</code> , the competition matrix in plants and animals <code>M</code> , the cooperation matrix between plants and animals

Details

.

Value

the derivation

<code>sdcn</code>	<i>sdcn: Structures and Dynamics on (of) Complex Networks.</i>
-------------------	--

Description

The `sdcn` package provides three categories of functions:

1. Structures
2. Dynamics
3. Analysis

Structures functions

[swaplinks](#)

Dynamics functions

[swaplinks](#)

swaplinks	<i>Swapping links Algorithm for null model of bipartite networks, that generates random network (ensembles) which keep the node degree distribution of a real network.</i>
-----------	--

Description

Swapping links Algorithm for null model of bipartite networks, that generates random network (ensembles) which keep the node degree distribution of a real network.

Usage

```
swaplinks(bigraph, ntry = 5000)
```

Arguments

bigraph,	incidence matrix of a bipartite network, rows and cols represent two groups of nodes/species
ntry,	the possible maximum times of swapping links to try

Value

an incidence matrix of bipartite network whose links being randomly swapped.

Examples

```
swaplinks(bigraph)
```

Index

model.lv2, [2](#)

sdcn, [2](#)

sdcn-package (sdcn), [2](#)

swaplinks, [2](#), [3](#)