

# Package ‘perturbEcol’

April 20, 2015

**Type** Package

**Title** Simulation of ecological dynamic systems under environmental perturbations

**Version** 0.0.0.9000

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## Description

perturbEcol simulates the dynamics of ecological systems under environmental perturbations. The competition, antagonism (predator-prey), mutualism, and their hybrid ecological communities are simulated by dynamic models like Ordinary Differential Equations and Stochastic Differential Equations. Two kinds of environmental perturbations are modeled in the dynamics: continuous pressures and repeated pulses. Species extinction as a special case of perturbation are also modeled. All perturbations can effect on arbitrary setting of species or their interactions. Several structural features of interaction topology in ecological communities are simulated: scale-free, bipartite, nestedness, modularity, etc.

**Imports** methods,

deSolve (>= 1.10-8),

simecol (>= 0.8-4),

rootSolve (>= 1.6.5),

plyr (>= 1.8.1),

igraph (>= 0.7.1)

**License** GPL (>= 2)

## R topics documented:

perturbEcol-package . . . . . 1

**Index** 3

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perturbEcol-package	<i>perturbEcol: Simulation of ecological dynamic systems under environmental perturbations</i>
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## Description

**perturbEcol** simulates the dynamics of networked ecological systems that undergo environmental perturbations such as climate change etc.

The simulation model is implemented as S4 class with the following slots:

- `main = function(time, init, params, ...)`: a function holding the main equations of the model, such as ODE, SDE.
- `times`: vector of time steps or vector with three named values `from`, `to`, `by` specifying the simulation time steps.
- `init`: initial state (start values) of the simulation. This is a named vector of state variables such as species abundances.
- `params`: a list of model parameters whose values would be changed by iterated perturbations.
- `perturb = function(params, ...)`: a function describing(?) the perturbation or pressure by environments on ecological systems. The results of perturbations are the changing of model parameters.
- `perturbNum`: the number of repeated perturbations.
- `solver = function(main, times, init, params, perturb, perturbNum, ...)`: a function specifying the numerical algorithm of simulation. The algorithms model the dynamics of ecological systems undergoing environmental perturbations.
- `out`: the output of simulation.

## Details

Package:	perturbEcol
Type:	Package
Version:	1.0
Date:	2015-04-17
License:	What license is it under?

~~ An overview of how to use the package, including the most important ~~ functions ~~

## Author(s)

Who wrote it

Maintainer: Who to complain to <yourfault@somewhere.net> ~~ The author and/or maintainer of the package ~~

## References

~~ Literature or other references for background information ~~

## See Also

~~ Optional links to other man pages, e.g. ~~ <pkg> ~~

## Examples

~~ simple examples of the most important functions ~~

# Index

\*Topic **package**

perturbEcol-package, [1](#)

<pkg>, [2](#)

perturbEcol (perturbEcol-package), [1](#)

perturbEcol-package, [1](#)