

Package ‘statnet’

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Title Software Tools for the Statistical Analysis of Network Data

Depends R (>= 3.0), tergm (>= 3.4), ergm.count (>= 3.2.2), sna (>= 2.4)

Suggests networksis (>= 2.1.3), degreenet (>= 1.3.1), relevent (>= 1.0.4), ndtv (>= 0.10), EpiModel (>= 1.2.7), latentnet (>= 2.7.1), tsna (>= 0.2)

Imports statnet.common (>= 3.3), network (>= 1.13), networkDynamic (>= 0.9), ergm (>= 3.6)

Description An integrated set of tools for the representation, visualization, analysis, and simulation of network data. For an introduction, type `help(package='statnet')`.

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URL <http://statnet.org>

NeedsCompilation no

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R topics documented:

statnet-package	2
update_statnet	4

Index	6
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Description

statnet is a collection of software packages for statistical network analysis that are designed to work together, and provide seamless access to a broad range of network analytic and graphical methodology. The packages implement recent advances in network modeling based on exponential-family random graph models (ERGM), as well as latent space models and more traditional network methods. Together, the packages provide a comprehensive framework for ERGM-based cross-sectional and dynamic network modeling: tools for model estimation, model evaluation, model-based network simulation, and network visualization. The statistical estimation and simulation functions are based on a central Markov chain Monte Carlo (MCMC) algorithm. The coding is optimized for speed and robustness.

The code is actively developed and maintained by the statnet development team. New functionality is being added over time.

Details

statnet packages are written in a combination of R and C. It is usually used interactively from within the R graphical user interface via a command line. It can also be used in non-interactive (or “batch”) mode to allow longer or multiple tasks to be processed without user interaction. The suite of packages are available on the Comprehensive R Archive Network (CRAN) at <http://www.r-project.org/> and also on the **statnet** project website at <http://statnet.org/>

The **statnet** suite of packages has the following components:

For data handling:

- **network** is a package to create, store, modify and plot the data in network objects. The `network` object class, defined in the **network** package, can represent a range of relational data types and it supports arbitrary vertex / edge /graph attributes. Data stored as `network` objects can then be analyzed using all of the component packages in the **statnet** suite. (automatically downloaded)
- **networkDynamic** extends **network** with functionality to store information about about evolution of a network over time, defining a `networkDynamic` object class. (automatically downloaded)

For analyzing cross-sectional networks:

- **ergm** is a collection of functions to fit, simulate from, plot and evaluate exponential random graph models. The main functions within the **ergm** package are `ergm`, a function to fit linear exponential random graph models in which the probability of a graph is dependent upon a vector of graph statistics specified by the user; `simulate`, a function to simulate random graphs using an ERGM; and `gof`, a function to evaluate the goodness of fit of an ERGM to the data. **ergm** contains many other functions as well. (automatically downloaded)
- **ergm.count** is an extension to **ergm** enabling it to fit models for networks whose relations are counts. (automatically downloaded)

- **latentnet** is a package to fit and evaluate latent position and cluster models for statistical networks. The probability of a tie is expressed as a function of distances between these nodes in a latent space as well as functions of observed dyadic level covariates. (optional download)
- **sna** is a set of tools for traditional social network analysis. (automatically downloaded)
- **degreenet** is a package for the statistical modeling of degree distributions of networks. It includes power-law models such as the Yule and Waring, as well as a range of alternative models that have been proposed in the literature. (optional download)

For temporal (dynamic) network analysis:

- **tergm** is a collection of extensions to **ergm** enabling it to fit discrete time models for temporal (dynamic) networks. The main function in **tergm** is `stergm` (the “s” stands for separable), which allows the user to specify one ergm for tie formation, and another ergm for tie dissolution. The models can be fit to network panel data, or to a single cross-sectional network with ancillary data on tie duration. (automatically downloaded)
- **tsna** is a collection of extensions to **sna** that provide descriptive summary statistics for temporal networks. (optional download)
- **relevent** is a package providing tools to fit relational event models. (optional download)

Additional utilities:

- **ergm.userterms** provides a template for users who want to implement their own new ERGM terms. (separate download required)
- **networksis** is a package to simulate bipartite graphs with fixed marginals through sequential importance sampling. (optional download)
- **EpiModel** is a package for simulating epidemics (optional download)

statnet is a metapackage; its only purpose is to provide a convenient way for a user to load all of the packages in the statnet suite. It does this by depending on all of the packages, so that loading the **statnet** package into R automatically loads all packages above that are labeled "automatically downloaded". If the user specifies `install.packages("statnet", dependencies=T)`, **statnet** will also download all of the packages above that are labeled "optional download". Those can, of course, also be installed individually.

Each package in **statnet** has associated help files and internal documentation, and additional the information can be found on the Statnet Project website (<http://statnet.org/>). Tutorials, instructions on how to join the statnet help mailing list, references and links to further resources are provided there. For the reference paper(s) that provide information on the theory and methodology behind each specific package use the `citation("packagename")` function in R after loading **statnet**.

We have invested much time and effort in creating the statnet suite of packages and supporting material so that others can use and build on these tools. All we ask in return is that you cite it when you use it. For publication of results obtained from **statnet**, the original authors are to be cited as described in `citation("statnet")`. If you are only using specific package(s) from the suite, please cite the specific package(s) as described in the appropriate `citation("packagename")`. Thank you!

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update_statnet

Update the Component Packages of the Statnet Suite

Description

A wrapper around [update.packages](#) to update the component packages of Statnet Suite to their latest versions.

Usage

```
update_statnet(..., ask = FALSE, checkBuilt = TRUE, addURLs = character())
```

Arguments

ask, checkBuilt	Arguments to update.packages documentation. The defaults are different from those of that function.
addURLs	Optional repository URLs in addition to CRAN, such as http://statnet.csde.washington.edu/preview . Defaults to none.
...	Additional arguments to be passed to update.packages .

Details

Updates the list component packages of Statnet Suite, using [setRepositories](#) and [update.packages](#). Since there are no good ways to update packages once they are loaded, this function should be called immediately after restarting R.

Value

update_statnet returns NULL invisibly.

See Also

[setRepositories](#), [update.packages](#), [install.packages](#)

Examples

```
## Not run:  
# Update from CRAN  
statnet::update_statnet()  
  
# Update from statnet.org's preview release, taking packages from CRAN  
# as needed  
statnet::update_statnet(addURLs="http://statnet.csde.washington.edu/preview")  
  
## End(Not run)
```

Index

*Topic **utilities**

update_statnet, 4

ergm, 2

gof, 2

install.packages, 4

network, 2

networkDynamic, 2

setRepositories, 4

statnet (statnet-package), 2

statnet-package, 2

update.packages, 4

update_statnet, 4