

Time homogeneity					
sienaTimeTest					
For M waves there are $M-1$ periods.					
The assumption that parameters are constant in the $M-1$ periods is tested by <sienatimetest>.</sienatimetest>					
The <summary> method also produces effect-wise and period-wise tests.</summary>					
See RscriptSienaTimeTest.r					
Can be used also for multi-group projects; then, homogeneity of the groups is tested.					
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Time homogeneity					

The associated function <includeTimeDummy> can be used to interact the effects specified by time dummies, representing time heterogeneity.

An alternative for this purpose is to define time variables (dummies or trend or other time-dependent variables) and add those to the data set,

and then specify interactions

between the other effects and these time variables.

This is a bit more work but also more flexible and clearer.

E.g., you can use time dummies that are 0 first and 1 later on, and stay equal to 1.

Or you could use a linear, quadratic, logarithmic,, trend.

sienaGOF

A good model for network dynamics should represent the important features of the network in a good way.

For the features that are expressed by the target statistics, directly corresponding to the effects included in the model, this is guaranteed by adequate convergence of the MoM.

However, also other features should be represented well. For example, the distribution of indegrees and outdegrees, and the triad census.

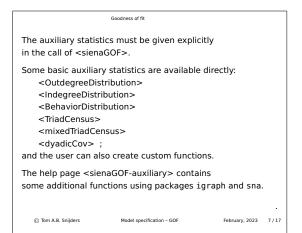
Perhaps also the distribution of geodesic distances.

This was brought forward as a goodness-of-fit criterion for ERGMS by Hunter, Goodreau, and Handcock (JASA, 2008).

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Goodness of fit
For SAOMs, the goodness of fit of a model can be tested by the function <sienagof>.</sienagof>
See Lospinoso & Snijders (Methodological Innovations, 2019).
This requires that <siena07> was run with returnDeps = TRUE.</siena07>
This option returns the simulated data sets in Phase 3 as part of the <sienafit> object produced by <siena07>.</siena07></sienafit>

Goodness of fit			
(from the help page:)			
This is done by simulations of auxiliary statistics, different from the statistics used for parameter estimation. The fit is good if the average values of the auxiliary statistics over many simulation runs are close to the values observed in the data.			
A Monte Carlo test based on the Mahalanobis distance is used to calculate <i>p</i> -values.			
This is a case where you wish the <i>p</i> -values to be <i>large</i> enough!			
A <plot> method can be used to diagnose poor fit.</plot>			
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Goodness of fit
Sketch of the use of sienaGOE
See ?sienaGOF and the script sienaGOF_vdB.R
The basic operation is as follows:
results1 <- siena07(myalq, data=mydata, effects=myeff,
               returnDeps=TRUE)
gof1.od <- sienaGOF(results1, verbose=TRUE,</pre>
               varName="friendship", OutdegreeDistribution,
               cumulative=TRUE, levls=0:10)
aof1.od
plot(gof1.od)
You can adapt the parameters levls and cumulative
in <sienaGOF>.
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Goodness of fit

Auxiliary functions

Some auxiliary functions are available within RSiena,

('out of the box'),

some are listed on the help page for <"sienaGOF-auxiliary">,

such as <GeodesicDistribution>,

and others can be made by yourself (...)

or in future by others (!!!).

If you wish to use <GeodesicDistribution>,

you have to take this function

from the <sienaGOF-auxiliary> help page and give it to R.

What is available now is not meant to be complete!
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How good a fit is required?

Since some time we have been moving to a new standard for publications using Siena, where the fit for the degree and behavior distributions should be adequate.

Of course it is also advisable to consider goodness of fit for the triad census and the geodesic distribution.

It may not always be possible to achieve a fit with p > 0.05for the Mahalanobis combination of all statistics under consideration.

But it should be attempted,

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and in my experience it usually is possible,

to have the data within the confidence band of *plot.sienaGOF* for the degree and behavior distributions.

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Goodne	ss of fit	Model specification		
How to specify the model? This depends of course on the purpose of the research, theoretical considerations, empirical knowledge				
But the following may be a guideline for specifying the network model:				
 Outdegree effect: always. Reciprocity effect: almost always. A triadic effect representing network closure. gwesp, transitive triplets, and/or transitive triads. transitive reciprocated triplets and/or three-cycles (see Block, <i>Social Networks</i>, 2015). 				
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