

# Package ‘qp’

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**Type** Package

**Title** q-order partial correlation graph search algorithm

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**Depends** R (>= 2.2.1)

**Description** This package is deprecated and it is now only a stub for the newer version called qpgraph available through the Bioconductor project. The q-order partial correlation graph search algorithm, q-partial, or qp, algorithm for short, is a robust procedure for structure learning of undirected Gaussian graphical Markov models from “small n, large p” data, that is, multivariate normal data coming from a number of random variables p larger than the number of multidimensional data points n as in the case of, e.g., microarray data.

**License** GPL (>= 2)

**Repository** CRAN

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 jmlr06data

*Synthetic data from the article by Castelo and Roverato (2006)*


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### Description

Synthetic data generated from two graphs with 150 vertices,  $G_1$  and  $G_2$ . In  $G_1$  the boundary of every vertex is at most 5, while in  $G_2$  the boundary of every vertex is at most 20

### Usage

```
data(jmlr06data)
```

### Format

IC.bd5:	inverse correlation matrix encoding the independence structure of $G_1$
IC.bd20:	inverse correlation matrix encoding the independence structure of $G_2$
S.bd5.N20:	sample covariance matrix from a sample of size 20 drawn from a normal distribution with mean 0 and inverse correlation matrix IC.bd5
S.bd5.N50:	sample covariance matrix from a sample of size 50 drawn from a normal distribution with mean 0 and inverse correlation matrix IC.bd5
S.bd5.N150:	sample covariance matrix from a sample of size 150 drawn from a normal distribution with mean 0 and inverse correlation matrix IC.bd5
S.bd20.N20:	sample covariance matrix from a sample of size 20 drawn from a normal distribution with mean 0 and inverse correlation matrix IC.bd20
S.bd20.N50:	sample covariance matrix from a sample of size 50 drawn from a normal distribution with mean 0 and inverse correlation matrix IC.bd20
S.bd20.N150:	sample covariance matrix from a sample of size 150 drawn from a normal distribution with mean 0 and inverse correlation matrix IC.bd20
qp.out.bd5.N20.q10:	output from <code>qp.search</code> applied to S.bd5.N20 with $q=10$ and $T=500$
qp.out.bd20.N20.q10:	output from <code>qp.search</code> applied to S.bd20.N20 with $q=10$ and $T=500$

### References

Castelo, R. and Roverato, A. (2006). A robust procedure for Gaussian graphical model search from microarray data with  $p$  larger than  $n$ , *J. Mach. Learn. Res.*, 7:2621-2650

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 qp

*The package 'qp': summary information*


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### Description

This package has been replaced by 'qpgraph' available at the Bioconductor project website (<http://www.bioconductor.org>)

## Data

This synthetic data forms still part of this package.

- [jmlr06data](#) synthetic data used in the referenced article

## Functions

- `qp.search` calculates the estimates of the non-rejection rates for every pair of variables. Now `qpNrr` in `qpgraph`.
- `qp.edge.prob` calculates the estimate of the non-rejection rate for a particular pair of variables, this function is also called by `qp.search`. Now `qpEdgeNrr` in `qpgraph`.
- `qp.ci.test` performs a test for conditional independence. Now `qpCItest` in `qpgraph`.
- `qp.analyse` provides some exploratory analyses on the output of `qp.search`. This function does not exist anymore.
- `qp.clique` calculates the maximum clique size as a function of the minimum threshold on the non-rejection rate for removing an edge. Now `qpClique` in `qpgraph`.
- `qp.hist` shows a histogram of the estimated non-rejection rates obtained through `qp.search`. Now `qpHist` in `qpgraph`.
- `qp.graph` returns the qp-graph, in the form of an incidence matrix, resulting of thresholding the non-rejection rates in the output of `qp.search`. Now `qpGraph` in `qpgraph`.
- `qp.matrix.image` makes an image plot of the absolute value of an inverse correlation matrix. This function does not exist anymore.
- `qp.get.cliques` finds the set of cliques of an undirected graph. Now `qpGetCliques` in `qpgraph`.

The package provides an implementation of the procedures described by Castelo and Roverato (2006) and is a contribution to the gR-project described by Lauritzen (2002).

## Authors

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## References

Lauritzen, S. L. (2002). gRaphical Models in R. *R News*, 3(2)39.

Castelo, R. and Roverato, A. (2006). A robust procedure for Gaussian graphical model search from microarray data with  $p$  larger than  $n$ , *J. Mach. Learn. Res.*, 7:2621-2650

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