**Instructions**

**To create the data used in the simulation studies**

1. All the scripts are available in the SimulatedData folder.
2. First run the script, “RankLikelihood\_p25\_n50\_AR1\_prior.m”. The functions that the script needs to run are available in the NecessaryFunctions folder. This script makes the prior.mat file that’s needed to run the simulation.
3. The other simulation combinations are run similarly using the corresponding names of the scripts.

**To run the simulation study in the paper using the Bayesian nonparanormal method,**

1. All the scripts are available in BayesianNonparanormalFunctions folder.
2. First run the script, “RankLikelihood\_p25\_n50\_tenpercent\_ranks.m”. The functions that the script needs to run are available in the NecessaryFunctions folder. This script runs the Bayesian nonparanormal method for the rank likelihood method and creates the mat file with the estimated matrices for all the hyperparameter settings. Model selection is not performed in this script.
3. To run the script, “RankLikelihood\_p25\_n50\_tenpercent\_Bsplines.m”. The functions that the script needs to run are available in the NecessaryFunctions folder. This script runs the Bayesian nonparanormal method for the B-splines method and creates the mat file with the estimated matrices for all the hyperparameter settings. Model selection is not performed in this script.
4. Fourth, to do model selection for the rank likelihood and B-spline methods, run the scripts, “RankLikelihood\_p25\_n50\_AR4\_ranks\_final.m” and “RankLikelihood\_p25\_n50\_AR4\_Bsplines\_final.m”
5. Third, the parameter estimation and structure learning boxplots were created with the script, “RankLikelihood\_Boxplot\_Edges\_p25\_n50.m” and “RankLikelihood\_Boxplot\_Loss\_p25\_n50.m”.

**To run the simulation study in the paper using the nonparanormal and BDGraph methods,**

1. All the scripts are available in the Nonparanormal folder.
2. For the BDGraph method, run the script, “BDGraph\_p25\_n50\_AR1.R” for the p=25 n=50 sparsity = AR(1) simulation combination. This script runs the Bayesian copula graphical model method and does the model selection.
3. For the nonparanormal SKEPTIC method, run the script, “Frequentist\_p25\_n50\_AR1\_skeptic.R” for the p=25 n=50 sparsity = AR(1) simulation combination. This script runs the copula nonparanormal method and does the model selection.
4. For the nonparanormal truncation method, run the script, “Frequentist\_p25\_n50\_AR1\_truncation.R” for the p=25 n=50 sparsity = AR(1) simulation combination. This script runs the truncated nonparanormal method and does the model selection.
5. The other simulation combinations are run similarly using the corresponding names of the scripts.

**Create the Data for the Simulation Tables**

1. All the scripts are available in the SimulationTables folder.
2. Run the script, “RankLikelihood\_Boxplot\_Edges\_table.R” and “RankLikelihood\_Boxplot\_Loss\_table.R” in order to pull together the data to construct the boxplots for all of the methods considered.

**To run the Real Data Example**

1. The script is available in the RealDataExample folder. The original dataset is available in the BDGraph R package.
2. To run the Bayesian nonparanormal method for rank likelihood on the dataset, run, “RealData\_RankLikelihood\_ranks.m”
3. To run the Bayesian nonparanormal method for B-splines on the dataset, run, “RealData\_RankLikelihood\_ranks.m”
4. Third, to run the Bayesian copula method on the dataset, run, “RealData\_BDGraph.R”.
5. Fourth, to run the nonparanormal SKEPTIC method on the dataset, run, “RealData\_skeptic.R”.
6. To run the nonparanormal truncated method on the dataset, run, “RealData\_truncation.R”.
7. Fifth, to create the graphs, run, “RankLikelihood\_RealData\_Graphs.m”.

**Additional Dependencies**

* MATLAB Symbolic Toolbox
* MATLAB Optimization Toolbox
* MATLAB Statistics and Machine Learning Toolbox
* HMC Exact: <https://github.com/aripakman/hmc-tmg>
* B-splines: <https://www.mathworks.com/matlabcentral/fileexchange/27374-b-splines?focused=5252160&tab=function>
* Matrix inverse: <https://www.mathworks.com/matlabcentral/fileexchange/34511-fast-and-accurate-symmetric-positive-definite-matrix-inverse-using-cholesky-decomposition>
* Nearest positive definite matrix: <https://www.mathworks.com/matlabcentral/fileexchange/42885-nearestspd>
* Gauss Quadrature: <https://www.mathworks.com/matlabcentral/fileexchange/26737-legendre-laguerre-and-hermite-gauss-quadrature?focused=5147547&tab=function>
* R and MATLAB read/write package: <https://cran.r-project.org/web/packages/R.matlab/index.html>
* Huge package: <https://cran.r-project.org/web/packages/huge/index.html>
* Xtable: <https://cran.r-project.org/web/packages/xtable/index.html>
* Real Data example: <https://cran.r-project.org/web/packages/BDgraph/index.html>
* Circular graphs: <https://www.mathworks.com/matlabcentral/fileexchange/48576-circulargraph>