Description of the replication files for “**Estimation and Inference in Spatial Models with Dominant Units**” by M. Hashem Pesaran and Cynthia Fan Yang

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This readme provides a summary of the MATLAB files needed for the replication of the results reported in the main paper as well as in the online supplement. The “MC\_programs” folder contains programs to replicate the Monte Carlo results. The “application” folder contains data and codes to replicate the results of the empirical application.

**List of Files:**

**Monte Carlo Simulations**

|  |  |
| --- | --- |
| **Main programs** |  |
| main\_MC.m | Main program to run simulations under various DGPs with different estimation methods |
| outtab.m | Tabulates MC results (in the format of the tables in the supplement) |
| plot\_power\_main\_paper.m | Plots empirical power functions for BMM and GMM estimators as displayed in the main paper |
| plot\_power\_supplement.m | Plots empirical power functions for BMM, GMM and ML estimators as displayed in the supplement |
| **Functions** |  |
| BMM\_moment\_SARX\_iid.m | Forms moment conditions for the BMM estimator assuming homoskedastic errors |
| BMM\_moment\_SARX\_het.m | Forms moment conditions for the BMM estimator assuming heteroskedastic errors |
| GMM\_multiP\_moment\_SARX.m | Forms moment conditions for the GMM estimator |
| GMM\_multiP\_var\_SARX\_iid.m | Computes variance of the GMM estimator assuming homoskedastic errors |
| GMM\_multiP\_var\_SARX\_het.m | Computes variance of the GMM estimator assuming heteroskedastic errors |
| invpd.m\* | Computes generalized inverse (required for MLE) |
| matadd.m\* | Performs matrix addition if only row or column is compatible (required for MLE) |
| nearestSPD.m\*\*\* | Finds the nearest positive definite matrix |
| normw.m\* | Normalizes row sums of a matrix such that each row sums to unity |
| qqWeight.m | Generates "q ahead and q behind" spatial weights matrix |
| sar2.m | Implements ML estimation |
| f\_sar.m\* | Evaluates concentrated log-likelihood (required for MLE) |
| f2\_sar.m\* | Evaluates log-likelihood (required for MLE) |
| lndetfull.m\* | Computes log det(I-rho\*W) using sparse matrices (required for MLE) |

**Empirical Application**

|  |  |
| --- | --- |
| **Data** |  |
| data\_application.mat | Data used in the empirical application |
|  | Contains price levels and W matrices |
| **Main Program** |  |
| main\_application.m | Main program for the empirical application |
| **Functions** |  |
| est\_delta.m\*\* | Estimates the degrees of dominance |
|  |  |
| BMM\_SARX.m | Implements the BMM estimation |
| rbstw.m | Constructs robust spatial weights matrix with a given threshold |
| The rest of the .m files are the same as those in the MC\_programs folder. | |

Notes:

\* Codes from the Econometrics Toolbox by James P. LeSage.

\*\* This function was part of the replication package accompanying the study by Pesaran and Yang (2020).

\*\*\* Retrieved from MATLAB Central File Exchange. Only used for BGMM estimation of pure SAR models when rho=0.95 and delta=1.

**References**

John D'Errico (2014). nearestSPD (<https://www.mathworks.com/matlabcentral/fileexchange/42885-nearestspd>), MATLAB Central File Exchange. Last accessed December 2019.

Lesage, J. P. Econometrics Toolbox Version 7. Available at <https://www.spatial-econometrics.com/>.

Pesaran, M. H. and C. F. Yang (2020). Econometric analysis of production networks with dominant units. *Journal of Econometrics* (forthcoming).

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