

B-MASTER Reproducibility Instructions

We describe the reproducibility instructions in three sections. Please refer to the following list to see which section describes the reproducibility of the tables and figures below.

Figures

- Figure 1: NA (concept diagram).
- Figure 2: NA (concept diagram).
- Figure 3: refer to Simulation study 2.
- Figure 4: refer to Simulation study 1.
- Figure 5: refer to Simulation study 2.
- Figure 6,7,8,9,10,11: refer to Real data analysis.

Tables

- Table 1: refer to Simulation study 1.
- Table 2: refer to Simulation study 2.
- Table 3: refer to Real data analysis.

1. Simulation study 1

1. **Create Dummy data:** Go to [Simulation study 1 / Dummy Real Data / Generate_Dummy_Real_via_BMASTER](#).
2. Run [BMASTER_MockRealDataGenerate.m](#) to generate estimated coefficient matrix, which is considered as the True coefficient matrix for the rest of this simulation study.
3. Outputs are generated within [Generate_Dummy_Real_via_BMASTER / Data](#).

4. The generated data is copied and placed in [Simulation study 1 / Dummy Real Data](#) (already copied, no need to copy again).
5. In [Dummy Real Data](#), run [GENERATE_Y_DATA.m](#) to generate 10 realizations of Y based on X and earlier estimated B ("True beta"). Now data generation is completed.
6. Copy the generated datasets to the sub-folders within [Simulation study 1](#), namely, [BMASTER](#), [SSLasso](#), [mSSL](#), [Remmap](#) (already copied, no need to copy again).
7. **B-MASTER results:** Run [BMASTER](#) / [BMASTER_on_simReal_v3.m](#).
8. **SSLasso results:** Run [SSLasso](#) / [SSLASSO_on_simReal.R](#).
9. **mSSL results:** Run [mSSL](#) / [mSSL_dpe_on_simReal.R](#) (for dpe method), and [mSSL](#) / [mSSL_dCpe_on_simReal.R](#) (for dcpe method).
10. **Remmap results:** Run [Remmap](#) / [remMAP_on_simReal.R](#) (for original method), and [Remmap](#) / [remMAPBic_on_simReal.R](#) (for BIC-based approximation method).
11. Copy all the outputs to [Simulation study 1 / Summary Table and Plots](#) (already copied, no need to copy again).
12. Run [Summary Table and Plots](#) / [Summary_tables_plots.R](#) to generate **Table 1** outputs, and **Figure 4 (bottom right)**.
13. Run [Summary Table and Plots](#) / [Post_analysis_plot.R](#) to generate **Figure 4 (up; bottom left)**.

2. Simulation study 2

1. Go to [Simulation study 2](#) and open [BMASTER_scalability.m](#).
2. Setting `IsRhoNonZero = 0` run it for $P = (20, 50, 100, 200, 500, 1000, 2000)$.
3. Setting `IsRhoNonZero = 1` run it for $P = (20, 50, 100, 200, 500, 1000, 2000)$.
4. Run [Simulation study 2 / Summary_comp_time.R](#), that generates **Figure 5**, and two csv files corresponding to the **upper and lower halves of Table 2**.
5. Go to [Simulation study 2 / remMap scalability](#).
6. Run [BMASTER_v_remmap.m](#) thrice setting `SampleMultFactor = 1, 5, 10`.
7. Run [remMAP_scalability.R](#) thrice setting `SampleMultFactor = 1, 5, 10`.
8. Run [Comparison_plot.R](#). That generates **Figure 3 (both left and right)**.

3. Real data analysis

1. Go to [Real Data Analysis](#). Run [BMASTER_Real_Data.m](#).
2. Run [Extraction_subset_for_analysis.R](#).
3. Run [Overall_plots.R](#). That generates **Figure 6,7,8**.
4. Run [Post_analysis_subset_1_NEW.R](#). That generates **Figure 9**.
5. Run [Post_analysis_subset_2_NEW.R](#). That generates **Figure 10**.
6. Run [CCA_subset_plots.R](#). That generates **Figure 11**.
7. Go to [Real Data Analysis / Validation on real data](#).
8. Run [BMASTER_Real_Data_validation.m](#). Also run [SSLASSO_RealData_validation.R](#), [mSSL_dCpe_RealData_validation.R](#), [remMAPBic_RealData_validation.R](#). This sequence of executions generate 4 outputs csv files corresponding to corresponding methods; which results are assembled and presented in **Table 3**.