

## 1. Example 1:

### 1.1 Obtaining Optimal Designs

- The r-code to obtain designs using three loss functions are available in the following folder: *Example1/Rcodes/design\_selection*.
- It is required to install the r-package *MaternEx1\_1.0.tar.gz* to run this example.
- The designs for this example can be obtained by running the main r-script called *main\_Clayton.R* inside the folder.
- Inside the file *main\_Clayton.R*, there are different options for users to run this code. They are:
  - *d\_no* = number of design points in the design
  - *utility* = negative value of the loss function
  - *Dependence* = spatial dependency structure of the two responses

We have run this code with two different values for *d\_no* (5 and 10) and three different values for *Dependence* (0.2, 0.5 and 0.8) based on the three loss functions. The resulting designs are saved in the following folder: *Example1/Selected\_designs*.

### 1.2 Design Evaluation

- After designs have been determined for each loss function, they can be evaluated based on each design objective.
- For this purpose, the *Example1\_design\_evaluation.R* function can be used. Here, two parameters, *d\_no* and *Dependence* should be set before running this code.
- Design evaluation results are saved in the folder *Example1/Simulation\_results/Design\_evaluation*.

### 1.3 Compare two approximations

- To compare the two approximations used in the paper for evaluating the prediction loss values, the function *main.R* can be used. This file is location in folder: *Example1/Rcodes/Comparing\_two\_approximations*.

### 1.4 Simulation Results

- To obtain the plots and tables shown for Example 1 we used the results obtained in Sections 1.2 and 1.3 above.
- The results obtained in Sections 1.2 and 1.3 are available in *Example1/Simulation\_results*.
- *Example1\_plots.R* in the *Master* folder can be used to plot the results for Example 1.

## 2. Example 2:

### 2.1 Obtaining Optimal Designs

- The r-code to obtain designs using three loss functions are available in the following folder: *Example2/Rcodes/design\_selection*.
- It is required to install the r-package *AirQualityRcpp\_1.0.tar.gz* to run this example.
- The designs for this example can be obtained by running the main script called *main\_Clayton.R* inside the folder.

- Inside the *main\_Clayton.R*, there are two options for users to run this code. They are,
  - *d\_no* = number of design points in the design
  - *utility* = negative value of the loss function
- We have run this code with four different values for *d\_no* (5, 7, 10 and 15) based on the three loss functions. The resulting designs are saved in the following folder: *Example1/Selected\_designs*.

## 2.2 Design Evaluation

- After designs have been determined for each loss function, they can be evaluated based on each design objective.
- For this purpose, the function called *Example2\_design\_evaluation.R* can be used. Here, two parameters, *d\_no* and *Dependence* should be set before running this code.
- Design evaluation results are saved in the folder: *Example2/Simulation\_results/Design\_evaluation*.

## 2.3 Compare two approximations

To compare the two approximations used in the paper for evaluating the prediction loss values, the *main.R* function in the following folder can be used:

*Example2/Rcode/Comparing\_two\_approximations*.

## 2.4 Simulation results

- To obtain the plots and tables shown for Example 2 we used the results obtained in Sections 2.2 and 2.3 above.
- The intermediate results obtained in Sections 2.2 and 2.3 are saved in *Example2/Simulation\_results*.
- We use the function *Example2\_plots.R* available in the *Master* folder to obtain the results related to Example 2.

## 3. Design Comparison (Supplementary material):

- To obtain designs from cluster 3 in Example2, we used the same set of code discussed in Section 2.1 above.
- Here, the function *main\_Clayton\_C3.R* is used for design selection.
- To compare the efficiencies of the two approximations to the prediction loss function, the same set of r-code discussed in Sections 1.3 and 2.3 can be used. Here, the *main\_efficiency.R* functions available in the respective folders can be used.
- The figures and tables available in the Supplementary material can be obtained using the function *supplementary\_plots.R* available in the *Master* folder.