

Description of How to Run the R-Codes for Reproducing the Results Presented in the Paper

Step 1: Install the following R packages included in this ZIP folder:

- *DynamicGP*: fits svdGP, knnsvdGP and lasvdGP models. Also depends on “laGP”, and “lhs”.
- *serialization*: records the intermediate results after each repetition of the simulation. It writes the results into a text file and loads back the results for creating the plots.
- *simfuncs*: contains the test functions (simulators) for Examples 1 and 2, and the codes for evaluating the normalized mean square prediction error (NMSPE) and the proper scoring rule.

“DynamicGP” is also available on CRAN [<https://CRAN.R-project.org/package=DynamicGP>].

One can use the following commands for installing the four packages:

```
$ R CMD INSTALL DynamicGP/  
$ R CMD INSTALL serialization/  
$ R CMD INSTALL simfuncs/
```

Go to Example 1 (or Example 2) folder for running the codes specific to the test function. The two folders are almost the same except the definition of the simulator name and the input dimension: Example 1 – “forretal” with $d = 3$, and Example 2 – “environ” with $d = 5$.

Step 2: Specify the input dimension “ d ”, training data size “ nn ”, test data size “ mm ”, and the number of simulations to run “ $numrep$ ”. Generate the training and test data sets using:

```
$ Rscript gendata.r
```

Step 3: Fit the full and local SVD-based GP models by running

```
$ Rscript svdgp.r  
$ Rscript localsvdgp.r
```

Note that the full SVD-based GP model consumes huge amount of memory and computational time. It is advised to run it on computational clusters rather than PC. One can tune the parameters of these codes, in particular, “ $nthread$ ” adjusts the number of cores for parallel processing.

Step 4: After the simulation is complete, the following code transforms the output files “svdgp.txt” and “localsvdgp.txt” into more convenient csv files

```
$ Rscript dataprocess.r
```

Step 5: Finally, the boxplots in Figures 1 and 2 of the paper can be generated using

```
$ Rscript makefig.r
```

Further details on the list of arguments that can be tuned upon for different functions in these packages are outlined in “[user_guide.pdf](#)”.