Paper: Statistical Modeling for Spatio-Temporal Data from Physical Convection-Diffusion Processes
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This file provides an overview of the relationship (i.e., structure) between different R files in the folder

SPDE_Simulation_e3.R

Description:
simulate the data used in the numerical example

Subroutines:
1). SPDE_Simulation_Sub.R
Data:
1). M2010L23S81.RData (radar image which is used to create the initial condition)
2). data_0313_example3_beta.RData (generated by "SPDE_Get_Beta.R")

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SPDE_Process_e3.R

Description:
process the data generated from SPDE_simulation_e3.R or other sources

Subroutines:
1). N/A
Data:
1). data_0313_example3_ksi.RData (generated from SPDE_Simulation_e3.R)
2). data_0313_example3_grd_original.RData (generated from SPDE_Simulation_e3.R)

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SPDE_Analysis_e3.R

Description:
statistical inference for the dynamical model

Subroutines:
1). "SPDE_Simulation_Sub.R"
2). "SPDE_Analysis_Sub_G.R"
3). "SPDE_Analysis_Sub.R"
4). "Kalman.R"
5). "dmvn.R"
6). "SPDE_Analysis_e3_Sub.R"
Data:
1). data_0313_example3_process.RData
2). data_0313_example3_ksi.RData
3). data_0313_example3_grd_original.RData

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SPDE_Output_e3.R

Description:
Visualization and process the output of SPDE_Analysis_e3.R

Subroutines:
1). "SPDE_Simulation_Sub.R"
2). "SPDE_Analysis_Sub_G.R"
3). "Kalman.R"
Data:
1). data_0313_example3.RData (simulated data)
2). data_0313_example3_process.RData (processed data by SPDE_Process_e3.R)
3). J2_example3_b.RData (output data using 2 kernels for the velocity field)
4). J4_example3_c.RData (output data using 4 kernels for the velocity field)