Codes Description of Example Model

This package (example_model) of Matlab codes corresponds to the example model proposed in Supplementary S9. The functions and implementary procedures for the whole package are listed below for reader's convenience.

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**FUNCTION PART ONE:**
Performance evaluation by comparing MG with GA and PSO (Fig. S9-5 & Fig. S9-6)

**IMPLEMENTARY PROCEDURES:**

- **Step 1:** generate experimental data
  run #data_generation.m
- **Step 2:** estimate parameters by GA, PSO, and MFG (10 repetitions through HPC)
  For GA:
  1) run #GAsetErrorParameter_GA.m to get the model settings
  2) run #GAmain_GA.m to estimate the parameters
  3) run #GAssemble_results_GA.m to assemble together the results from 10 repetitions
  For PSO:
  1) run #PSOsetErrorParameter_PSO.m to get the model settings
  2) run #PSOmain_PSO.m to estimate the parameters
  3) run #PSOassemble_results_PSO.m to assemble the results from 10 repetitions
  For MFG:
  1) run #MFGstep1_initializationsetErrorParameter.m;setErrorParameter_full.m to get the model settings for step1_initialization
  2) run #MFGstep1_initialization\main_initialization.m to get the large_scopes
  3) run #MFGstep2_MFGsetErrorParameter.m to get the model settings for step2_MFG
  4) run #MFGstep2_MFG\main_MFG.m to get the small_scopes
  5) run #MFGstep3_refinementsetErrorParameter.m to get the model settings for step3_refinement
  6) run #MFGstep3_refinement\main_refinement.m to get the final estimation
  7) run #MFGassemble_results_MFG.m to assemble together the results from 10 repetitions
- **Step 3:** draw figures to present the results of comparisons
  run #fitting_result_comparison.m for Fig. S9-5
  run #estimation_error_comparison.m for Fig. S9-6

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**FUNCTION PART TWO:**
Novelty for Step I and Step II in MFG (Fig. S9-7)

**IMPLEMENTARY PROCEDURES:**

- **Step 1:** get accuracy rates for GA and PSO related methods
  run #GAaccuracy_rate_GA.m for GA related method
  run #PSOaccuracy_rate_PSO.m for PSO related method
- **Step 2:** draw figures to present the results of comparisons
  run #accuracy_rate_comparison.m for Fig. S9-7

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**Note 1:** please pay attention to the notes within
#MFGstep1_initialization\exComputation.m;individualParallel.m

**Note 2:** please see the data of p-values in Fig. S9-6 and Fig. S9-7 through
#t_value_calculation.m;t_values.mat;p_values.mat