

This software package implements the cloned SMC² routine of Duan-Fulop-Hsieh (2018) for the 3 models used in the paper to illustrate the method. The package is written in MATLAB.

There are three subfolders containing the code for the three models

- SMC_LinGauss for the linear gaussian state space model.
 - Subfolder LinGaussFilter contains the model-specific components (prior and likelihood)
 - RunEstimation_LinGauss.m is the main script that sets the algorithm settings and runs the estimations
 - Workflow to reproduce Table 1 and Figure 1:
 1. Run RunEstimation_LinGauss.m
 2. Run ProdFigures.m
- SMC_MixedLogit for the mixed logit model
 - Subfolder mlogit contains the model-specific components (prior and likelihood)
 - Main_SML.m runs simulated MLE for the model
 - Main_SMC2_fixp.m runs cloned SMC² for the model with fixed p
 - Main_SMC2_autop.m runs cloned SMC² for the model with automatically adjusted p
 - Workflow to reproduce Table 2 and Figure 2
 1. Run Main_SML.m
 2. Run Main_SMC2.m_fixp twice, setting on line 33, N_latent_particles=200 and N_latent_particles=400 always changing the name of the output file on line 133 accordingly
 3. The results from 1-2 are shown in Table 2.
 4. Run_Main_SMC2_autop.m
 5. Run ProdFigure2.m to produce Figure 2.
- SMC_CensoredGarch for the censored GARCH model
 - Subfolder CensoredGARCH contains the model-specific components (prior and likelihood)
 - Subfolder SMC contains the code used in the SMC algorithm
 - Subfolder dailyprice_marketcap contains the raw data. CreateDataset.m is the script that constructs the actual data set used in the estimation from the raw data. This dataset is in ChineseData.mat
 - ChineseRun.m runs the cloned SMC² routine on the data
 - Workflow to produce Table 3 and Figure 3
 1. To produce the data structure used in the estimation from the raw data, run CreateDataset.m. This will create a matlab data structure, output, saved in ChineseData.mat that contains the data for the 500 Chinese firms in the raw data with the most price limit violations.
 2. Run ChineseRun_GARCH.m. This script runs the simple GARCH models estimations using cloned SMC (not SMC² as here we have access to the exact likelihood) on the 100 firms with the most violations
 3. Run ChineseRun.m. This script runs estimates the Censored GARCH model using cloned SMC² on the 100 firms with the most violations.

4. Run ProdResults.m to reproduce Table 3 and Figure 3

The likelihood function for the three models are written to allow either cpu or gpu computation. If flag `filtersettings.gpu==1`, they use a gpu. The condition for this latter is that there is a cuda-capable gpu on the system and that the matlab parallel toolbox is installed.

For setting the remaining algorithm parameters please see examples in the scripts implementing the algorithm for the models.