This software package implements the cloned SMC^2 routine of Duan-Fulop-Hsieh (2018) for two models used in the paper to illustrate the method. The package is written in MATLAB.

There are two subfolders containing the code for the three models

- 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 SMC^2 for the model with fixed p
    - Main_SMC2_autop.m runs cloned SMC^2 for the model with automatically adjusted p
    - Workflow to reproduce Table 1 and Figure 1
        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 outpuf file on line 133 accordingly
        3. The results from 1-2 are shown in Table 1.
        4. Run_Main_SMC2_autop.m
        5. Run ProdFigure1.m to produce Figure 2.
- 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 2 and Figure 2:
        1. Run RunEstimation_LinGauss.m
        2. Run ProdFigures.m

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.