**This folder contains all the essential code and results regarding the gradient matching approach presented in Xiao et al.**

File “**PDE\_GradientMatching\_Main**” and “**PDE\_GradientMatching\_Functions**” are used to produce parameter estimation results at different CVs.

File “**PDE\_GradientMatching\_FixPar**” and “**PDE\_GradientMatching\_Functions\_FixPar**” are used to produce parameter estimations at different CVs with certain parameter values constrained.

File “**PDE\_GradientMatching\_PostProcess**” is used to process all the collected data and obtain the final results presented in the paper.

File “**Convergence check of optimizations**” checks the convergence of optimizations performed in the original results to ensures the parameter estimates are obtained after the convergence in **optim** is reached.

File “**Plot\_patterns**” is used to plot the invasion pattern based on parameter values chosen.

Folder “**Gradient plots**” contains all the plots of averaged and explicit spatial/temporal gradients involved in the PDE system studied in the paper.

Folder “**Possible solutions to improve accuracy**” contains all the code and results that aim to improve the accuracy of parameter estimates.

Folder “**Results without perturbation**” contains the reference gradients predicted by the gradient matching scheme with no measurement errors added to the data and the true gradients calculated by the finite difference scheme.

Folder “**Sensitivity tests results**” contains all the results of the three sensitivity tests mentioned in the paper.

Folder “**SimRes\_ests**” and “**SimRes\_ests\_converge\_check**” contains the original results and the updated results with convergence checked obtained using the gradient matching scheme.

All simulation results were generated using R 3.5.3 “Great Truth”.