Manual introduction

This manual is a brief introduction of how to use the provided functions to fit model, predict stock price, trade, cluster etc. It would include the introduction of each file and how to use the main functions.

Basemodel.py: Provided the basemodel of time series.

Cluster.py: Provided class “Cluster”. It includes four clustering methods: “kmeans”, “hierarchy clustering”, “Gaussian mixture model” and “spectral clustering”.

Data\_prossessor.py: Provided the transforming function between stock price and return, the function getting the maximum drawdown and the function returning the indicator of peak and trough.

Gradient\_check.py: Provided the function for deriving numerical gradient.

Inference.py: Provided functions for computing the auto-covariance of AR model and testing significance of parameters.

Model.py: Provided model class “AR” and “MA”, including functions for computing the log-likelihood and gradient given the data and an AR or MA model and the function for future price prediction.

### Optim.py: Provided several optimization methods: stochastic gradient descent, stochastic gradient descent with momentum update and [Broyden–Fletcher–Goldfarb–Shanno algorithm](https://en.wikipedia.org/wiki/Broyden%E2%80%93Fletcher%E2%80%93Goldfarb%E2%80%93Shanno_algorithm)。

### Option\_pricing.py: Provided functions for option pricing.

### Reduction.py: Provided functions for dimensional reduction for data visualization.

### Solver.py: Provided functions for model fitting given data and the model “lag”.

### Trading.py: Provided functions for deciding the transaction time point based on future price prediction and computing profit over the time.

### Ts\_gen.pyx & c\_ts\_gen.c: Provided functions to generate simulation data.