MOOCs 2 (Massive Open Online Course 2) Report of 2017
by Professor Ryoichi Yamamoto (Self-paced)

Course Name: Stochastic Processes: Data Analysis and Computer Simulation
Course Start Date: Aug. 3, 2017 9:00 UTC
Course End Date: Aug. 2, 2018 23:30 UTC

Total Enrollment: 8151
Completed Enrollment: 165
Verified Enrollment: 128 (fee'd)
Verified Completed Enrollment: 80

Enrollment from 152 Countries/Regions in Total
---Top10 Countries---

Country	Enrollment
USA	1518
India	582
UK	484
Germany	266
Canada	238
Brazil	232
Mexico	212
France	210
China	204
Japan	164

Age Group
< 25	20.9 %
25-40	61.4 %
41 <	17.7 %

Syllabus

Week 1: Python programming for beginners

Using Python, iPython, and Jupyter notebook

Making graphs with matplotlib

The Euler method for numerical integration

Simulating a damped harmonic oscillator

Week 2: Distribution function and random number

Stochastic variable and distribution functions

Generating random numbers with Gaussian/binomial/Poisson distributions

The central limiting theorem

Random walk

Week 3: Brownian motion 1: basic theories

Basic knowledge of Stochastic process

Brownian motion and the Langevin equation

The linear response theory and the Green-Kubo formula

Week 4: Brownian motion 2: computer simulation

Random force in the Langevin equation

Simple Python code to simulate Brownian motion

Simulations with on-the-fly animation

Week 5: Brownian motion 3: data analyses

Distribution and time correlation

Mean square displacement and diffusion constant

Interacting Brownian particles

Week 6: Stochastic processes in the real world

Time variations and distributions of real world processes

A Stochastic Dealer Model I

A Stochastic Dealer Model II

A Stochastic Dealer Model III