



Steven Millington

Okemos Applied Systems Research

An Exposition on Simulating Stochastic Processes

smillington@oasr.com

Given the importance of stochastic processes and their simulation in several areas of research: queueing theory, finance, dynamics, and computational biology, etc. We look to reinvigorate and extend an open-source approach to simulating stochastic processes and analyzing their properties.

We select the Python programming language for its simplistic syntax, ease of deployment, and high level of adoption and support by the scientific computing community. The speed trade-off encountered with selecting Python is addressed by leveraging the ability to integrate Python with C/C++ and the ability to use just-in-time compilers to generate optimized machine code for CPU/GPU hardware. Equal attention is given to both the accuracy and speed with which processes are simulated, as well as, providing a user-friendly experience via the application-programming interface.