Class exercise

Simulation and Modeling (CSCI 3010U)

Faisal Qureshi

Autocorrelation

Given a time-series, time displaced autocorrelation is computed using the following relationship:

$$C_A(t) = \frac{\langle A(t_0)A(t_0+t)\rangle - \langle A\rangle^2}{\langle A^2\rangle - \langle A\rangle^2},$$

where $A(t)$ be the measurements of some quantity A at time t (or configuration t): $t = 1 \cdots N$.

Consider the following code that generates $A(t)$ for $t = 1 \cdots 100$.

```
import numpy as np

A = [0,0]
for i in range(100):
    A.append(np.random.randn() + A[-1]*0.1 + A[-2]*0.4)
```

You are asked to complete the following function that computes autocorrelation for this data.

```
def autocorr(X, lag):
    return 0.0
```

Due back before the end of the class.