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 \( t = 1 \cdots 100 \).

```python
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.

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

Due back before the end of the class.