

Portfolio I - Randomness

Figure 1 shows a sample of simulated busses, numbered 1 to 50, and their lateness values in minutes. Each lateness value is a random variable sampled from exponential distribution, which has the probability density function:

$$f(x; \lambda) = \lambda e^{-\lambda x}, \quad x \geq 0$$

where $\lambda > 0$ is the rate parameter, and $\frac{1}{\lambda}$ is the mean lateness. In this case, I chose mean lateness to be 5 minutes, hence $\lambda = \frac{1}{5}$.

Exponential distribution is used to model time between events in a Poisson process. Here, I use it to model time between a bus's scheduled arrival (0 minutes) and its actual arrival (simulated lateness).

In producing this plot, I performed the following steps:

- Generated 50 samples (bus number) of lateness using the `numpy.random.exponential` function, with an average lateness of 5 minutes.
- Created a plot using `matplotlib`, showing simulated bus lateness.

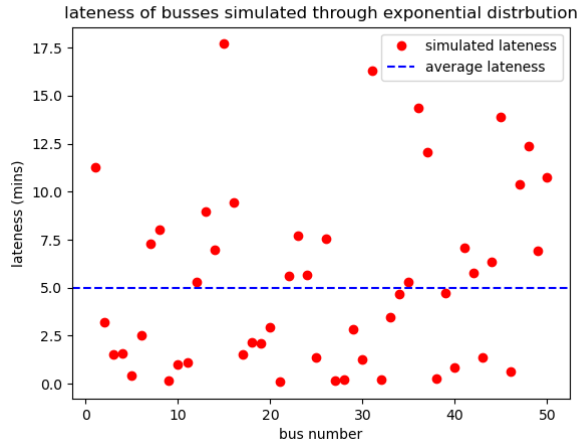


Figure 1: Simulated bus lateness using the exponential distribution, plotted with mean lateness of 5 minutes.