Network analysis and simulation
Homework 1

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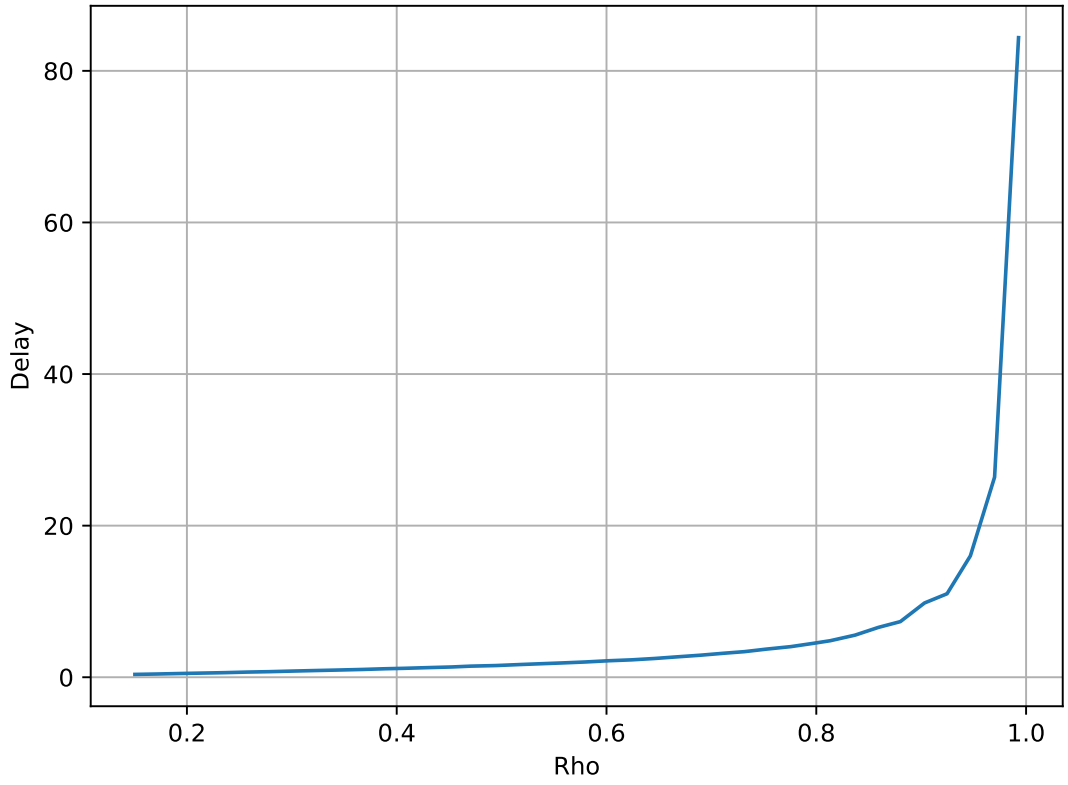
Exercise 1

In the first exercise the implementation of an event-driven simulation is required. I chose the second case proposed, I implemented a queue with Poisson arrivals of parameter λ and a single server with service time 1 time unit with probability p or 2 time units with probability $1 - p$. The following plot shows the average delay in the queue when the activity factor ρ varies from 0.1 to 1. As can be seen, the queue becomes unstable for ρ close to 1.



Exercise 2

The second exercise is required to choose one of the example seen in class and to compare the results of the simulations made using the raw estimator with those obtained using one of the variance reduction techniques. I chose the exercise 8d, where antithetic variables are used to reduce exponential r.v.'s variance. The following plot shows the two different variance and their 95% Confidence Interval (CI).