IMM - DTU

02407 Stochastic Processes
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DAME/dame

Solution for exercise 9.2.2 in Karlin and Pinsky

We have to calculate the Waiting time W for a M/M/2 system

$$\begin{aligned} \pi_0 &= \frac{1}{11} \quad L_0 = \frac{125}{33} \\ W_0 &= \frac{125}{66} \\ \Rightarrow \quad W &= \frac{30}{11} \quad L = \frac{60}{11} \end{aligned}$$

if we compare this to the M/M/1 system with adjusted service rate, we optain

$$\begin{aligned} L &= \frac{\lambda}{\mu - \lambda} = 5 \\ W &= \frac{1}{\mu - \lambda} = 5 \end{aligned}$$

If there are more than one server, than the probability of having to wait more than the expected waiting time is smaler than int he case of just one server. We can imagine having one person in line with an extremly diffcult task.
If we look now at the case where only one customer is present. In this case the M/M/1 system has a higher service rate, therefore the likeliness of the que increasing is smaller.