1. Things I realized by plotting the residence time as function of f

When we plot two different plots which are, .95 utilization rate and .5 utilization rate, the difference in fraction of f impacts the waiting time of non-FastPass holder customers when the attraction is busy with .95 utilization rate the most. By looking at the plot of .95, it is clear that the resident time of non-FastPass holders seems to describe the characteristics of M/M/1 model's residence time, with different utilization rate or the residence time seem to increase exponentially especially rapidly after 0.6

Interestingly with .5 utilization, both FastPass Holders and Non-FastPass holders had to wait much shorter time. Their function look more linear than exponential.

So I believe utilization rate is the more important factor which affects the waiting time of low priority customers in priority queue than the fraction of high priority customers.

And this makes sense because when you go to disney, and go on to the ride like space mountain or the rite of passage during the day time, you would have to waiting line for 3 hours, but when you go to those attractions in the evening when there's a firework show, you barely have to wait because there are not a lot of customers in the first place.

2. What could be the best value of f?

I believe the best value for f in .95 utilization situation would be, between .4 to .5 so like .45. Although you could set the fraction of customers up-to 60% and low priority customers have to wait for 40 mins. But I am not sure if having so many FastPass holders would actually happen in the real world setting.

For the .5 utilization situation, it really does not matter how much fraction of customers are allocated FastPass other than something that sounds unrealistic like 80 %, 70 % or up.