Lab5 - Data Communication and Computer Networks (CS536)

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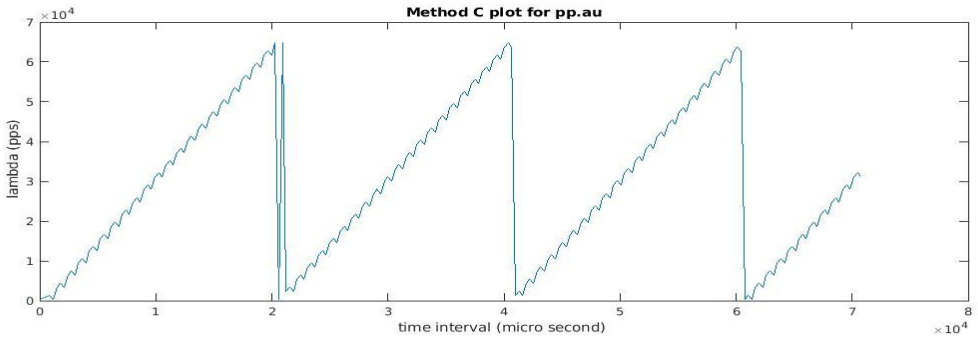
Problem 1- Performance evaluation

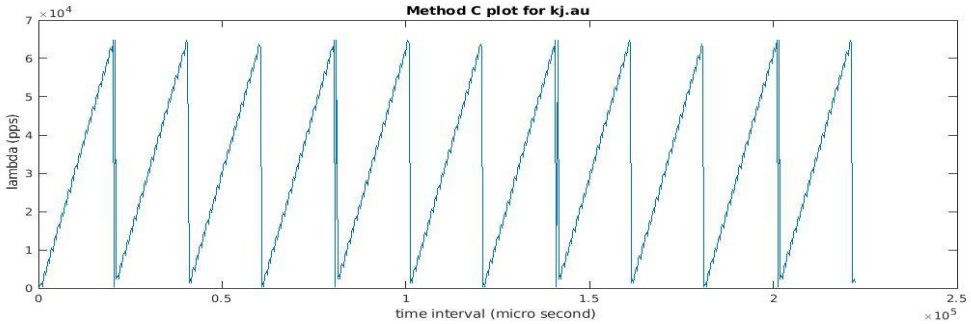
Method C:

This method tries to adjust magnitude of change as a function of the gap Q* and Q(t). We executed the program with three different configurations as shown below. There is unbounded oscillation in method C as observed in the graphs.

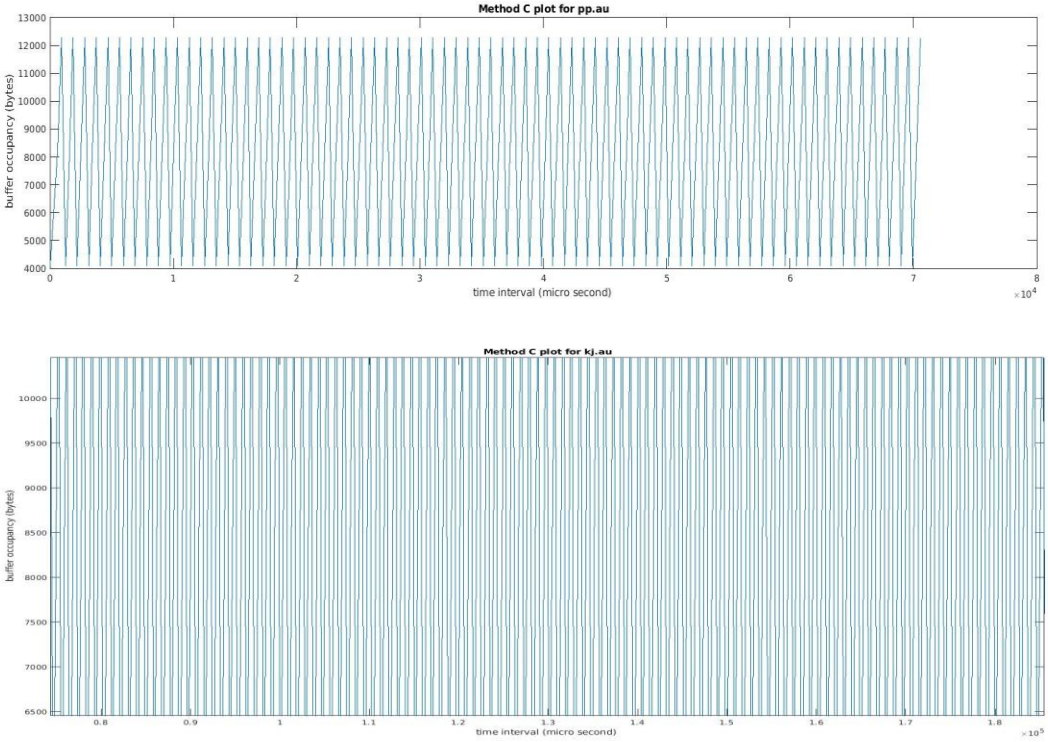
I. Block size = 4096, lambda = 313 (pps), epsilon=0.5

Below images are the plots for pp.au and kj.au respectively (lambda vs time interval generated by server).



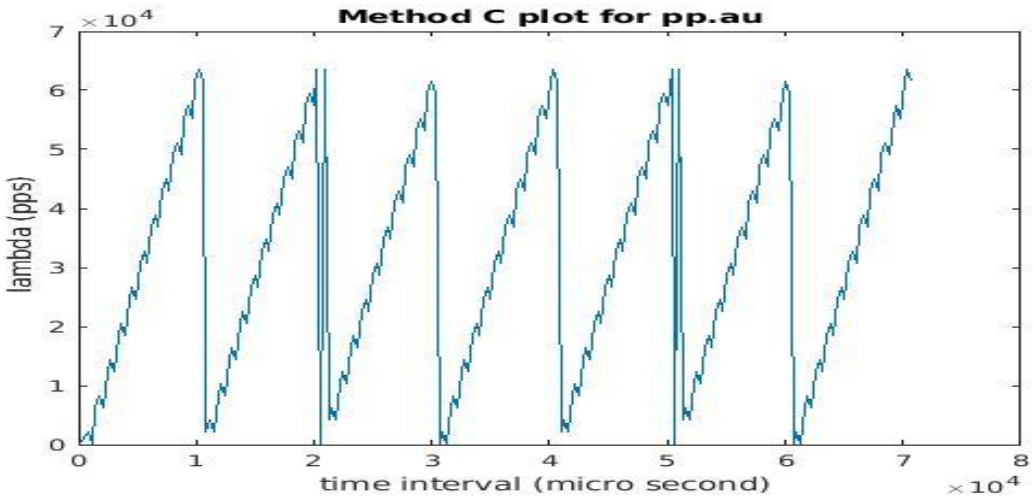


Below images are the plots for pp.au and kj.au respectively (buffer occupancy vs time interval generated by client).

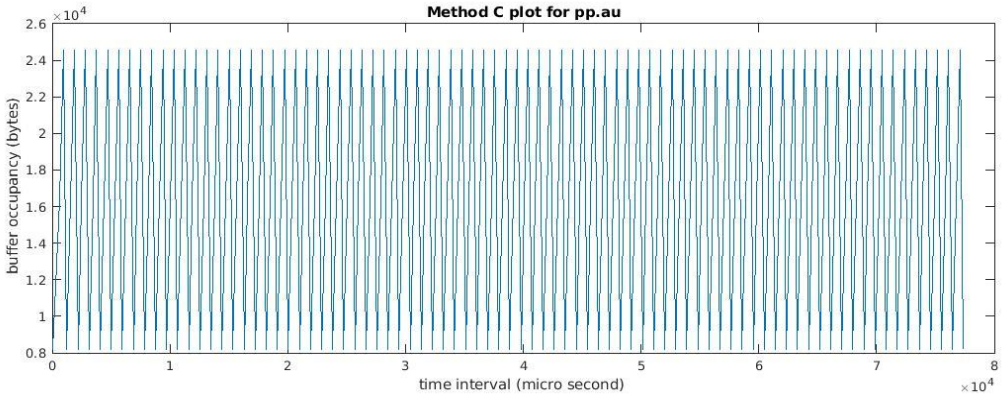


II. Block size = 2048, lambda = 3 (pps),epsilon=0.5

Below image is the plot for pp.au (lambda vs time interval generated by server).

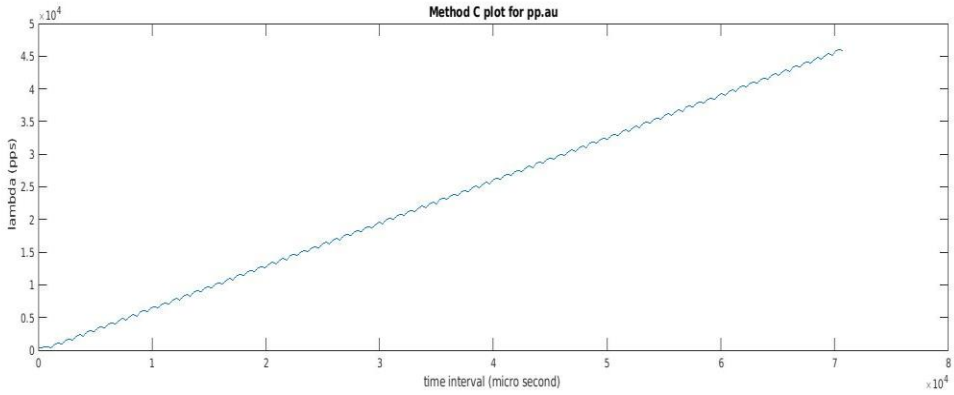


Below image is the plot for pp.au (buffer occupancy vs time interval generated by client).

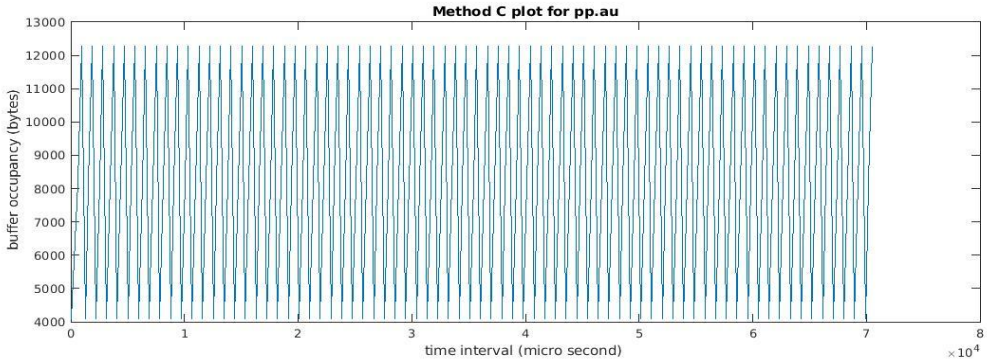


III. Block size = 4096, lambda = 313 (pps), epsilon=0.1

Below image is the plot for pp.au (lambda vs time interval generated by server).



Below image is the plot for pp.au (buffer occupancy vs time interval generated by client).

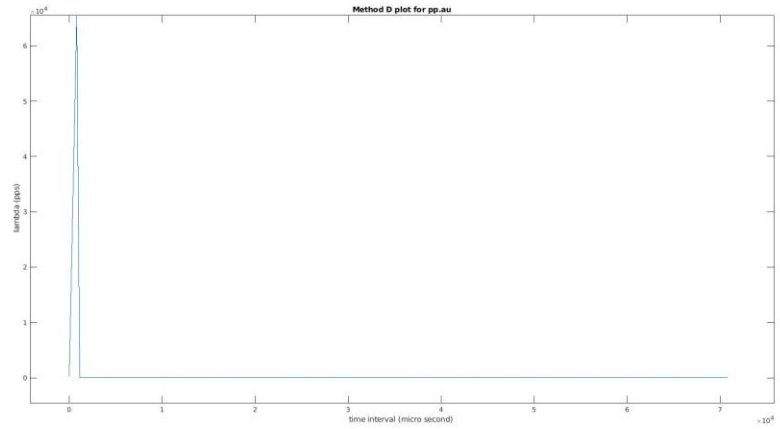


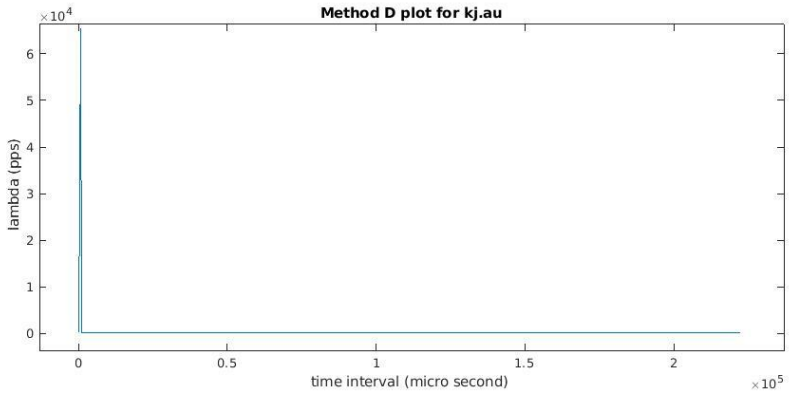
Method D:

In Method D, we take into consideration an additional term where we subtract lambda from gamma and multiply with additional parameter beta. Method D is superior to A, B, C and it dampens and converges to a desired state.

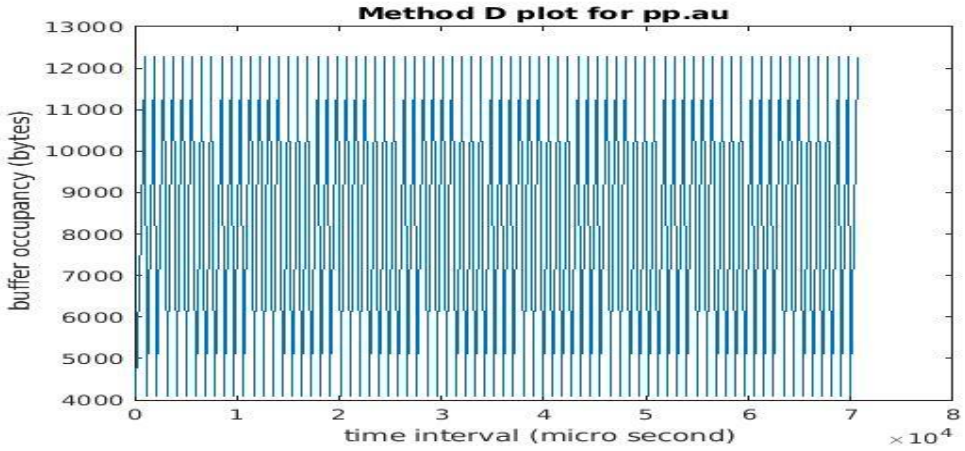
I. Block size = 4096, lambda = 313 (pps), epsilon=0.5, beta=1.1, gamma = 1/313

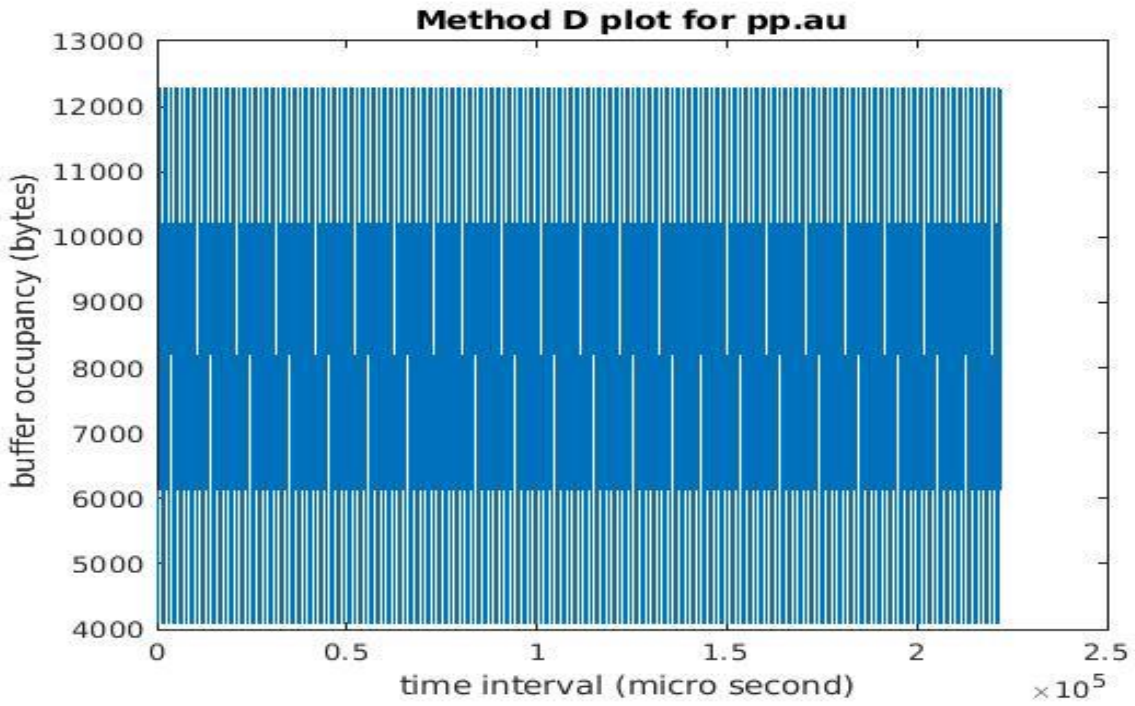
Below images are the plots for pp.au , kj.au (lambda vs time interval generated by server).





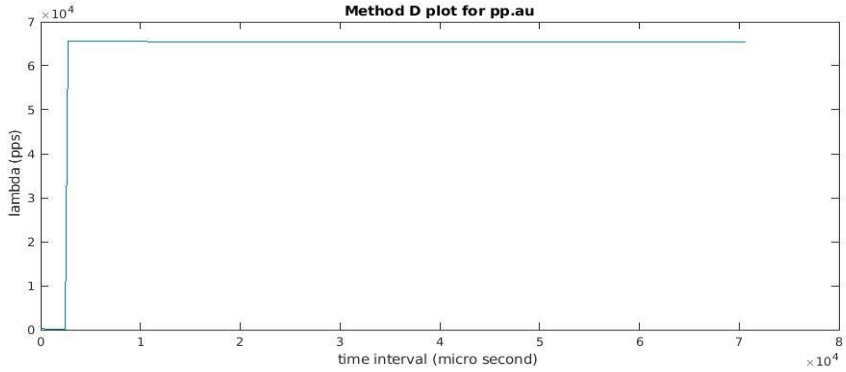
Below images are the plots for pp.au, kj.au (buffer occupancy vs time interval generated by client).



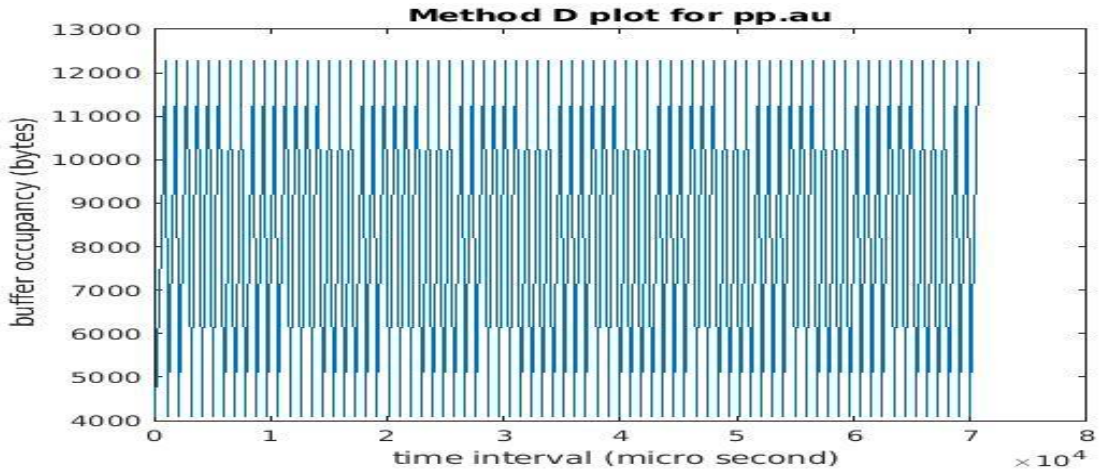


II. Block size = 2048, lambda = 3 (pps), epsilon=0.5, beta=1.1, gamma = 1/313

Below image is the plot for pp.au (lambda vs time interval generated by server).

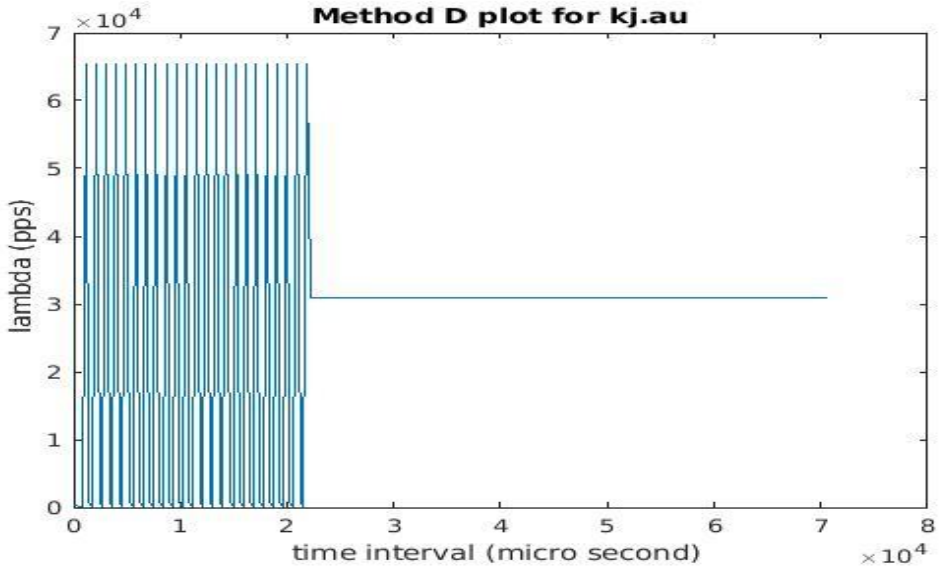


Below image is the plot for pp.au (buffer occupancy vs time interval generated by client).

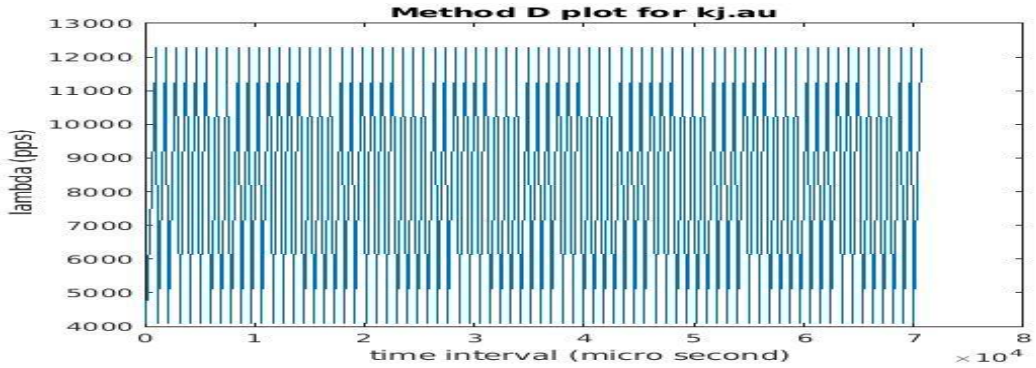


III. Block size = 4096, lambda = 313 (pps), epsilon=0.1, beta=1.0, gamma = 1/313

Below image is the plot for kj.au (lambda vs time interval generated by server).



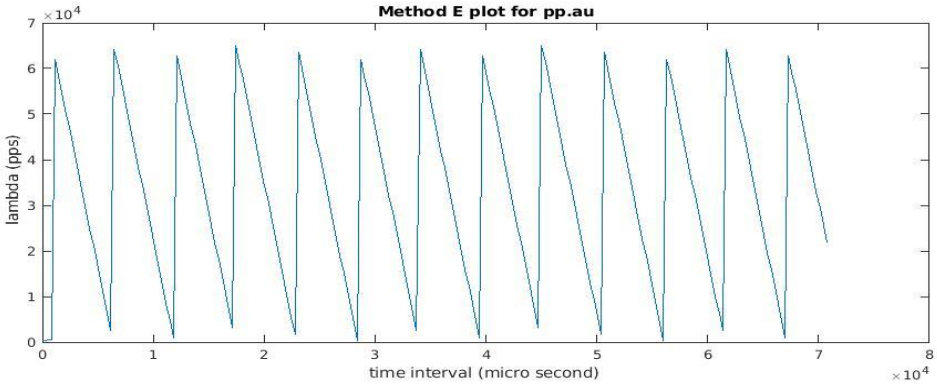
Below image is the plot for kj.au (buffer occupancy vs time interval generated by client).

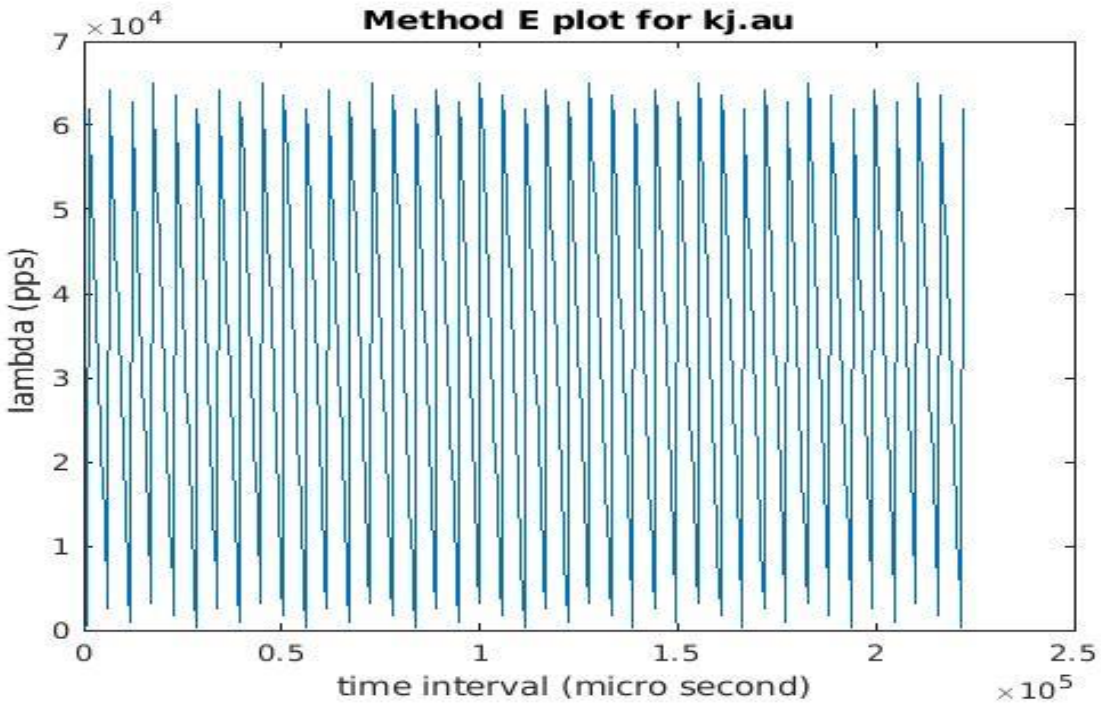


Bonus Problem:

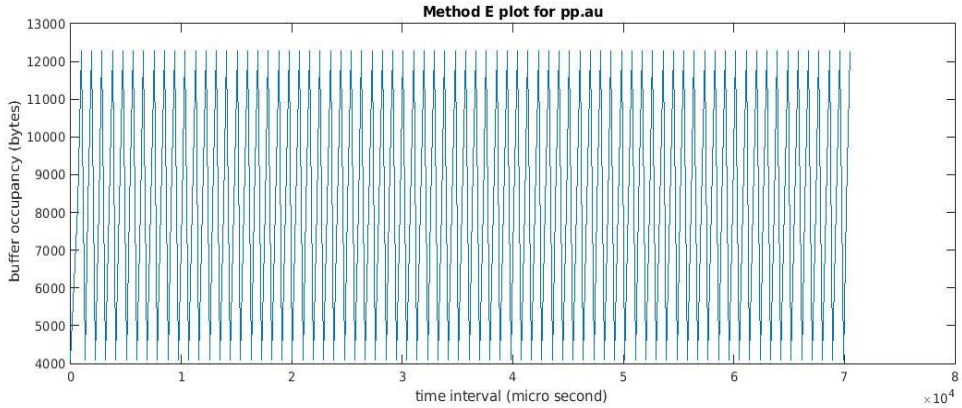
- In our program, we used UDP as the desired transport layer protocol.
- According to our Method E, the rate of lambda should be proportional to block size.
- If the block_size is large then the server needs to wait for a longer duration of pspacing which is 1/lambda.
- Hence we append an additional term to our method D, which increases our lambda by a factor of delta*block_size.
- Below are the observations for method E.
- Block size = 4096, lambda = 313 (pps), epsilon=0.5, beta=1.1, gamma = 1/313, delta=0.2

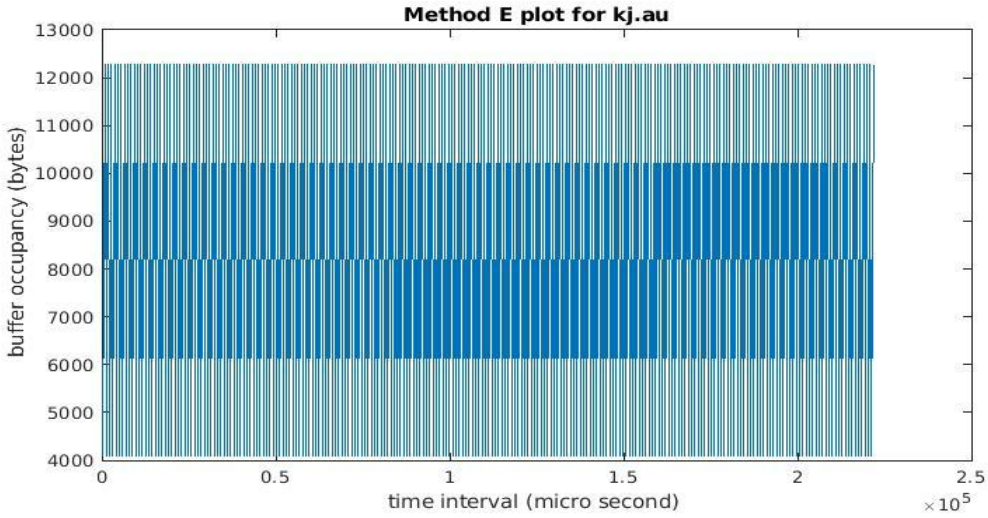
Below images are the plots for pp.au and kj.au respectively (lambda vs time interval generated by server).





Below images are the plots for pp.au and kj.au respectively (buffer occupancy vs time interval generated by client).


Method E plot for pp.au
buffer occupancy (bytes)
time interval (micro second)
×10^4


Method E plot for kj.au
buffer occupancy (bytes)
time interval (micro second)
×10^5