Plot of T and D (mean of means) against Service Time

Legend:
- y = T (mean of means)
- y = D (mean of means)

Service Time (S)

Plot of T and D (mean of 95th percentiles) against Service Time

Legend:
- y = T (mean of 95th percentiles)
- y = D (mean of 95th percentiles)

Service Time (S)

Plot of T and D (mean of means and mean of 95th percentiles) against Service Time

Legend:
- y = T (mean of means)
- y = D (mean of means)
- y = T (mean of 95th percentiles)
- y = D (mean of 95th percentiles)

Service Time (S)

Task 1: Increasing the service time keeping the buffer size constant

Below T refers to Total time to service a packet and D refers to the total orbiting time for a packet

Here, from the graph we observe that the initially for lower values of the service time (S = 2 to 4), the values of D [mean of means and mean of 95th percentiles] are approximately 0. This is because initially there are no orbiting packets as the buffer capacity is enough to hold the packets in queue and hence there are almost no orbiting packets. As the value of S increases (S = 4.5 to 5.5), the buffer queue becomes full very fast and hence the packets as they arrive, most of them tend to start orbiting and also re-orbit again and again and hence we find that with higher service time values, both T and D rises sharply.

We also find that for all values of Service times, the graph for means lies below the graph for 95th percentiles (common observation). Another observation is that as soon as we cross the Service time = 5, the 95th percentile value of the orbiting packets (D) becomes larger than the mean value of the total time to service a packet (T). Also, since orbiting times (D) are a subset of the total service time (T), the graph of D always lies below the corresponding graph of T.