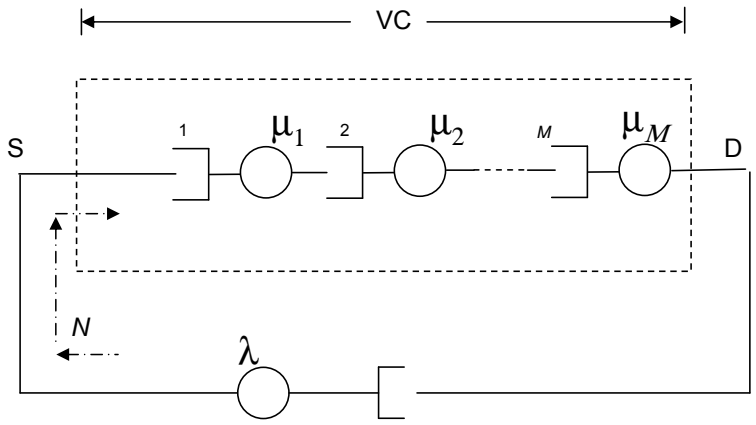
ECE 642
Lecture 10 - Excerpts

Network of Queues and their Modeling

Modeling using Norton Equivalency for Sliding Window Protocol exercised on VC.

- Exponential service time for each queue.
- $1/\mu_i$: mean service time at queue i.
- N: Window size for the VC.

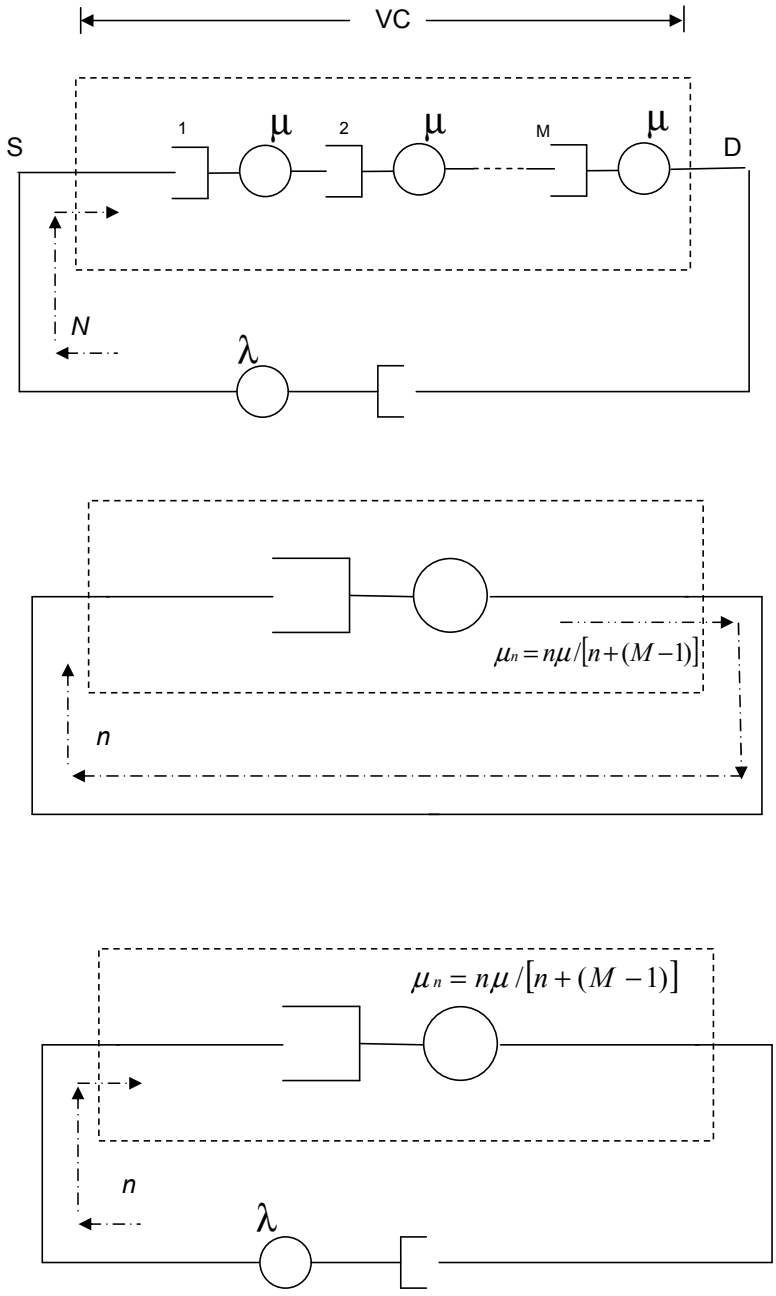


Assume $\mu_1 = \mu_2 = \mu_3 = ... = \mu_M = \mu$.
The throughput and time delay are given as follows:

$$\gamma = \sum_{n=1}^{N} u(n) p_n$$

$$E(T) = \frac{E(n)}{\gamma} = \frac{\sum_{n=1}^{N} n p_n}{\gamma}$$

We are interested in the congestion region, or in the heavy load case. For this case $\lambda \gg \mu$. Or, for the VC in the limiting case λ approaches infinity, the throughput



and delay are found as follows:

$$\gamma = u(N) = \frac{N\mu}{M-1+N}$$

$$E(T) = \frac{N}{\gamma} = \frac{M-1+N}{\mu}$$