

Stochastic networks in the presence of heavy tails: a general introduction

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1. What is a stochastic network? Examples; Single-class networks versus multi-class networks
2. Congestion: Customer's point of view (delay, waiting time, sojourn time); system's point of view (workload, queue length)
3. Classical light-tailed stochastic assumptions I: Poisson arrivals, exponentially distributed service times (Jackson networks)
4. Classical light-tailed stochastic assumptions II: Renewal arrivals, iid service times endowed with finite moment generating function (MGF)

Heavy-tailed Case

1. Heavy-tailed distributions; examples (Regularly varying tails, Subexponential distributions (but we will not go into details here.)
2. Delay, sojourn time, workload for FIFO single-server queue
3. Queue length is different, busy-period is different, different disciplines (Processor Sharing (PS)) yield different results
4. Connections with “Fluid Models”
5. Multi-class models; stability issues, complications.