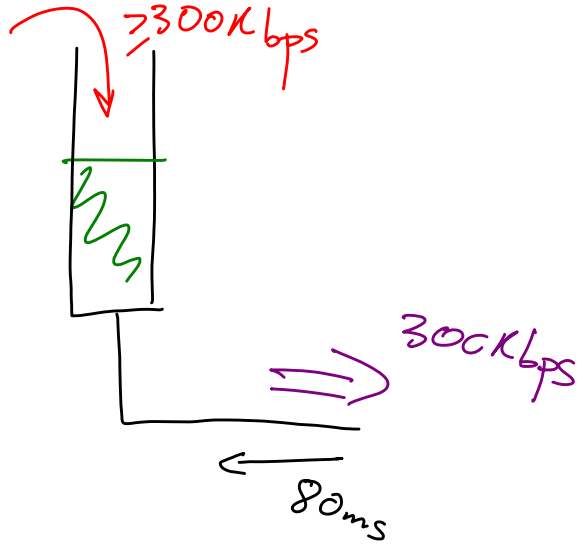
Lecture 20

Note Title 2/28/2005



Traffic characterization

X_t = # bytes crossing link between time t and $t+1$

... in POTS: Poisson Law

X_t = # call arrivals between time t and $t+\Delta t$

↳ i.i.d. (independent, identically distributed) exponential

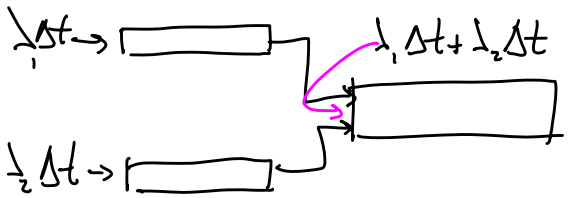
$$Pr[X_t = n] = e^{-\lambda \Delta t} \frac{(\lambda \Delta t)^n}{n!} \qquad (n \geq 0)$$

1. Validate
2. Parsimonious one parameter $\lambda \Delta t$

mean $= \lambda \Delta t$

variance $= \lambda \cdot \Delta t$

3. Sum of Poisson



4. Limited variability

$\Delta t \to c \cdot \Delta t$

$n \to cn$

$$\Pr[\tilde{X}_t = cn] = e^{-c\lambda\Delta t} \frac{(c\lambda\Delta t)^{cn}}{(cn)!} = e^{-c\lambda\Delta t} \frac{c^{cn}}{(cn)!} (\lambda\Delta t)^{cn}$$

$(cn)! \simeq (cn)^{cn}$