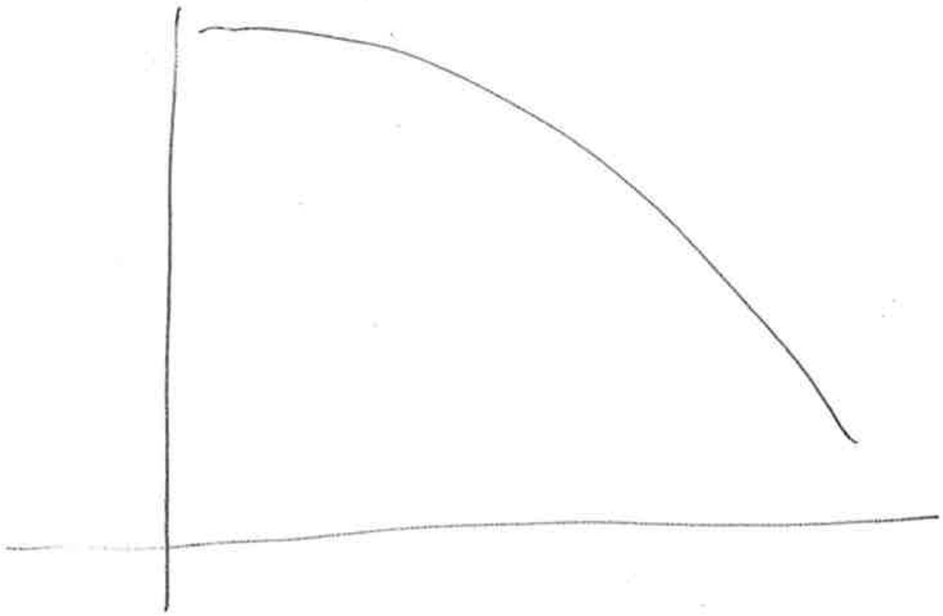
— mean, median, mode plot

—



for each value of $E[\tau]$ or λ

data file with 10,000 trials

trial data

λ	10	trial 1, trial 2, ... , trial 10,000
	15	trial 10,001, ... , trial 20,000
	20	

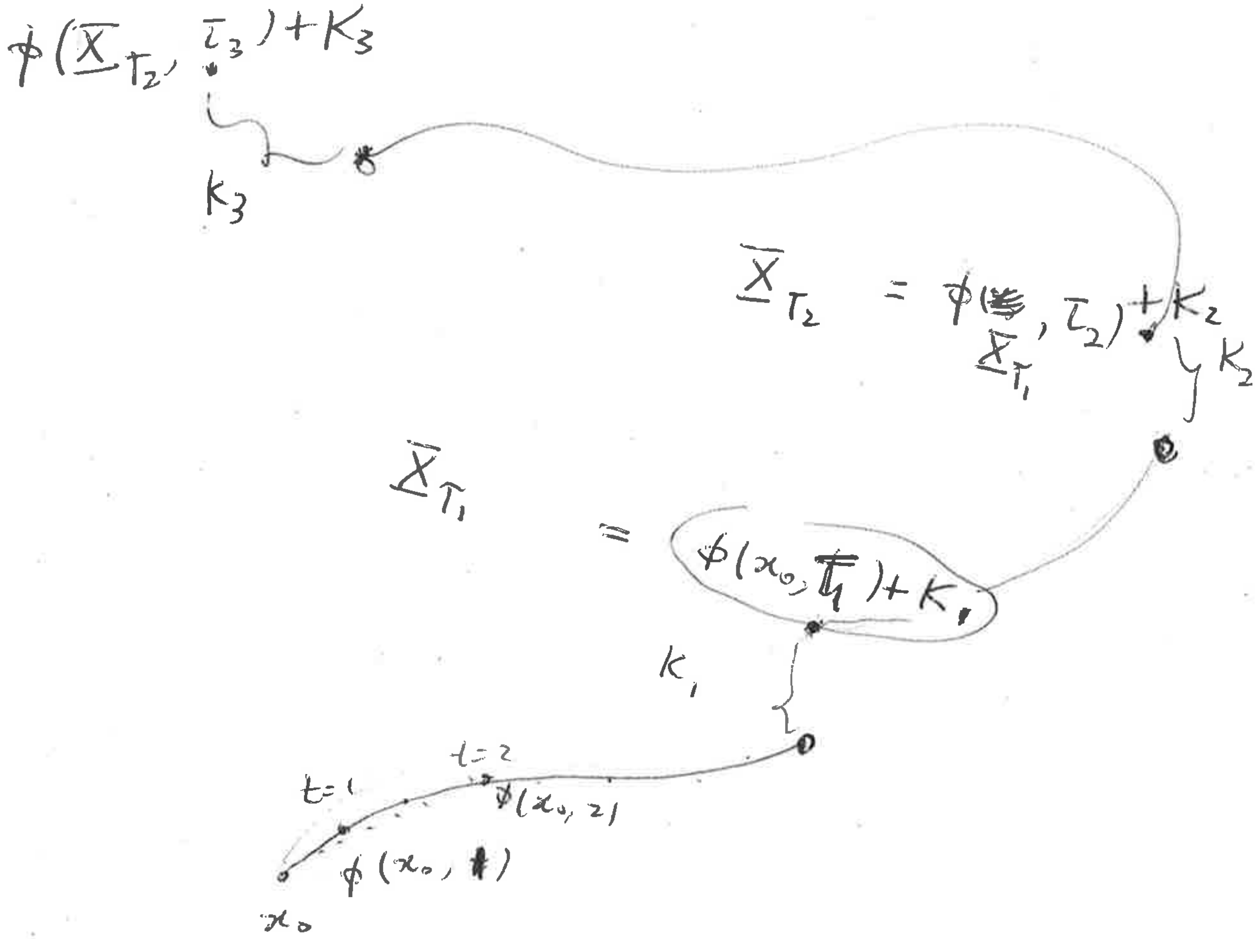
$$F : \mathbb{R}^6 \to \mathbb{R}^6$$

$$F(V, T, I, F, B, A)$$

$$= \left(\begin{array}{l} pI - cV - \mu VA - \beta VT \dfrac{V}{V_m + V} \\ \vdots \end{array} \right.$$

$$\phi(x_0, \cdot)$$

$$\phi(\cdot, \cdot)$$



$$\tau_n = T_n - T_{n-1}$$

$$\tau_1 = T_1 - T_0$$
$$= T_1 - 0$$
$$= T_1$$

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$N_1 \sim Pois(5)$

Poisson process

$N_{1/2} \sim Pois(5 \cdot \frac{1}{2})$

$N_{10} \sim Pois(5 \cdot 10)$

Given $\lambda > 0$, $(N_t)_{t \geq 0}$ is called a Poisson process if it's a collection of random variables such that

① $N_0 = 0$

② $N_t \sim Pois(\lambda t)$ $\forall$ $t > 0$

③ 

$N_{t+s} - N_t$ is distributed as $Pois(s\lambda)$, ie the same as N_s

(Stationary increments)

④ 

if $0 < q < r \leq s < t$

$N_r - N_q$, $N_t - N_s$ are indep

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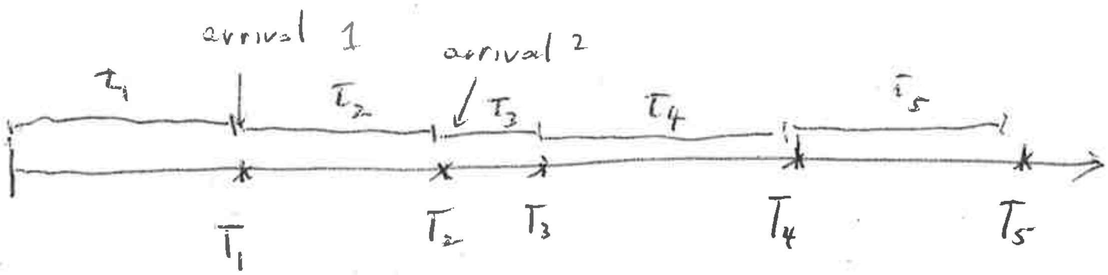


$\tau_1, \tau_2, \tau_3, \ldots$ are i.i.d. $Exp(\lambda)$

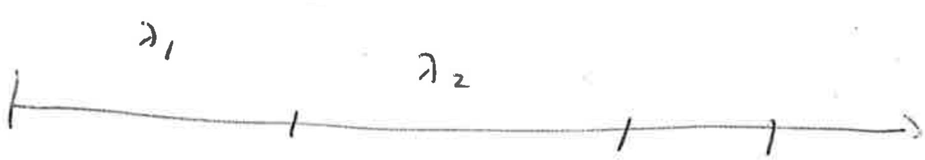
$T_1, T_2, T_3, \ldots$ are all Gamma distributed

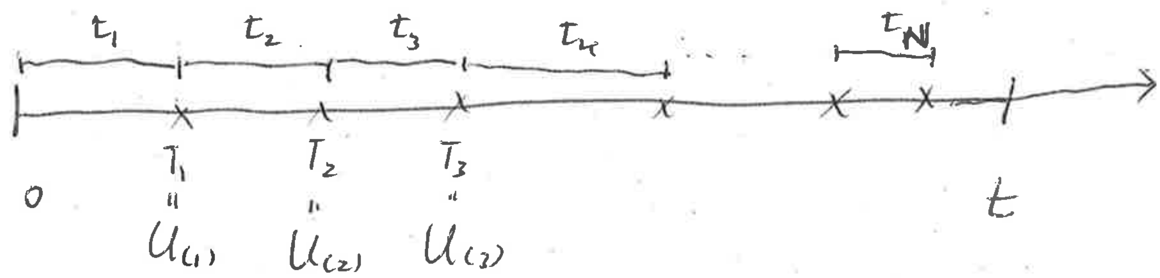
$T_1 \sim Gamma(1, \lambda)$

$T_2 \sim Gamma(2, \lambda)$

$\vdots$

$T_n \sim Gamma(n, \lambda)$





N_t is # of arrivals in $[0, t]$

suppose $N_t = N$ for some constant integer $N \geq 0$.

Let $U_1, U_2, \ldots, U_N$ be i.i.d.

~~Uniform r.v.'s~~ Unif $[0, t]$

Let them be sorted and call the sorted ones

$$U_{(1)} \leq U_{(2)} \leq \cdots \leq U_{(N)}$$ (called the order statistics of $U_1, \ldots, U_N$)

Then $U_{(1)}, U_{(2)} - U_{(1)}, U_{(3)} - U_{(2)}, \ldots$

$$U_{(N)} - U_{(N-1)}$$

have the same distribution as $t_1, \ldots, t_N$.