11/10/17.
~~08/06~~/17.

①. gamma function

$y=x^2$.

$x=1, 2, \cdots n$.

$y=1, 4, 9, \cdots$

$y=1.5^2, 2.7^2$.

$y=k!$

we know $k=1, 2, 3, \cdots$

$y=1!=1$.

$y=2!=2$.

$y=3!=6$.

$\vdots$

Q what about $k=1.5$.

$y=1.5!$

$= \bigcirc$?

def. $\Gamma(n) = \int_0^\infty x^n e^{-x} \cdot dx$ *

$n = 3$ $\quad \Gamma(3) = \int_0^\infty x^3 \cdot e^{-x} dx$

$=$

$\Gamma(n) = (n-1)!$

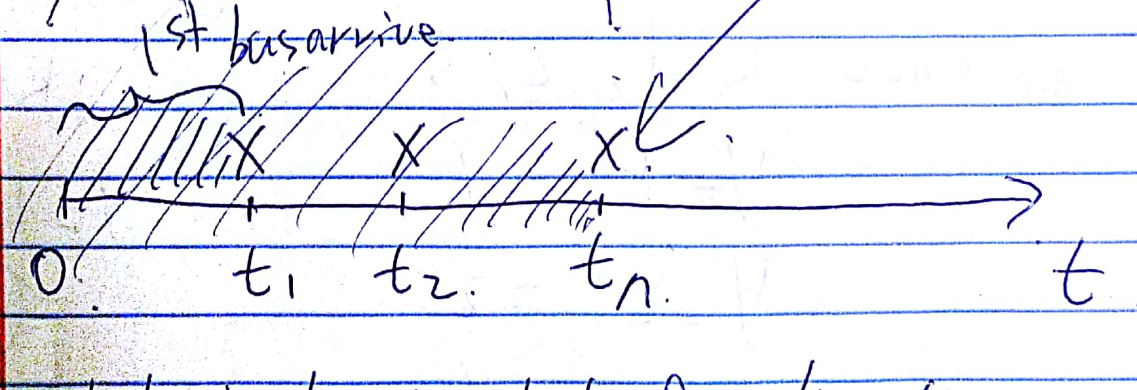
$\Gamma(3) = 2! = 2 \times 1 = 2$

later on

$\Gamma(1.5) =$

α^{th} event

② Gamma distribution



Q. What about the dist of waiting time for the α^{th} event occurred?

$$F(w) = P(W \le w)$$

$$= 1 - \underline{P(W > w)}$$

$$= \ldots\ldots$$

$$= \boxed{}$$

$$F'(w) = \boxed{}$$

pdf for the

Def

pdf

$$f(x) = \frac{1}{(\alpha-1)! \cdot \beta^{\alpha}} \cdot x^{\alpha-1} \cdot \exp\left(-\frac{x}{\beta}\right)$$

$$(\alpha-1)! = \Gamma(\alpha)$$

$$\beta : \beta = \frac{1}{\lambda}$$

$\alpha = 1$ $$f(x) = \frac{1}{(1-1)! \cdot \beta^1} \underline{x^{1-1}} \cdot \underline{\exp\left(-\frac{x}{\beta}\right)}$$

$$= \frac{1}{\beta} \exp\left(-\frac{x}{\beta}\right)$$

def. $f(x) = \frac{1}{\Gamma(\alpha)\cdot\beta^{\alpha}} \cdot x^{\alpha-1} \cdot \exp\left(-\frac{x}{\beta}\right)$.

$, x \geq 0$.

① $\Gamma(\alpha) = (\alpha-1)!$ α is integer.

② $\Gamma(\frac{1}{2}) = \sqrt{\pi}$

$E(X) = \alpha \cdot \beta$.

$Var(X) = \alpha \cdot \beta^2$.

Ex. $N(\mu, \sigma^2)$.

$Po(\lambda)$