

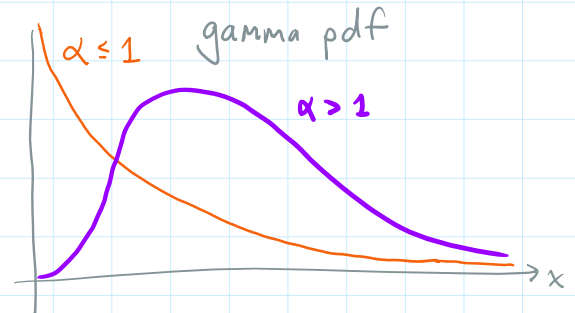
GAMMA DISTRIBUTION

$$X \sim \text{Gamma}(\alpha, \beta) \text{ has pdf } f(x; \alpha, \beta) = \begin{cases} \frac{1}{\beta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-x/\beta} & \text{if } x > 0 \\ 0 & \text{if } x \leq 0 \end{cases}$$

mean: $E(X) = \alpha\beta$

variance: $\text{Var}(X) = \alpha\beta^2$

mgf: $M_X(t) = \frac{1}{(1 - \beta t)^\alpha}, \quad t < \frac{1}{\beta}$



If $\alpha = n$ is an integer, then $X \sim \text{Gamma}(n, \beta)$ gives the time until the n^{th} occurrence in a Poisson process with rate $\frac{1}{\beta}$.