The Gamma Distribution

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The Basics

Continuous

Models time between Poisson event

Characteristics

$$X \sim \text{Gamma}(k, \theta)$$

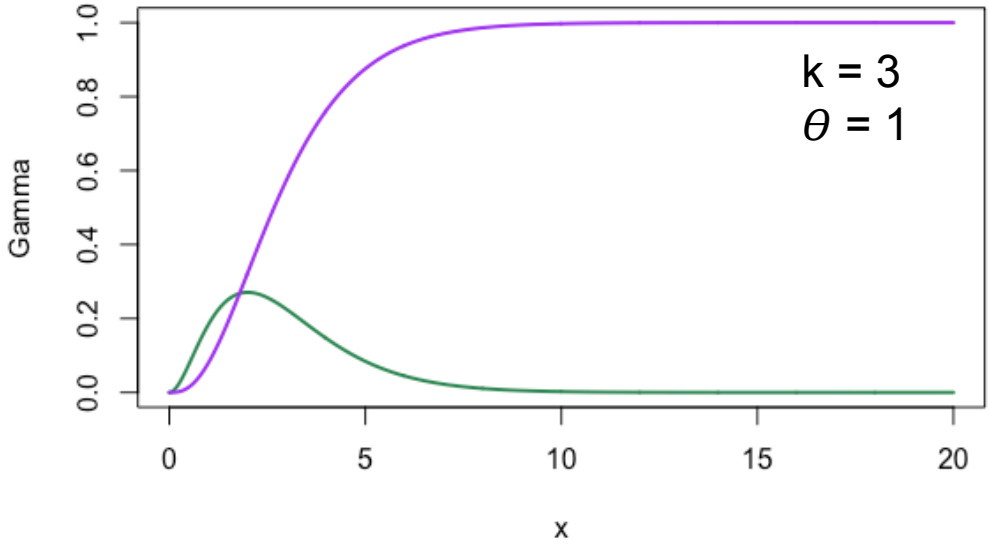
$$f_X(x) = \frac{x^{k-1} e^{-x/\theta}}{\Gamma(k)\theta^k}, \ x > 0$$

$$F_x(x) = 1 - \frac{\Gamma(k, \frac{x}{\theta})}{\Gamma(k)}$$

$$M_X(t) = (1 - \theta t)^{-k}, \ t > 0$$

Mean	$k\theta$
Variance	$k\theta^2$
Skewness	$\frac{2}{\sqrt{k}}$

R code examples

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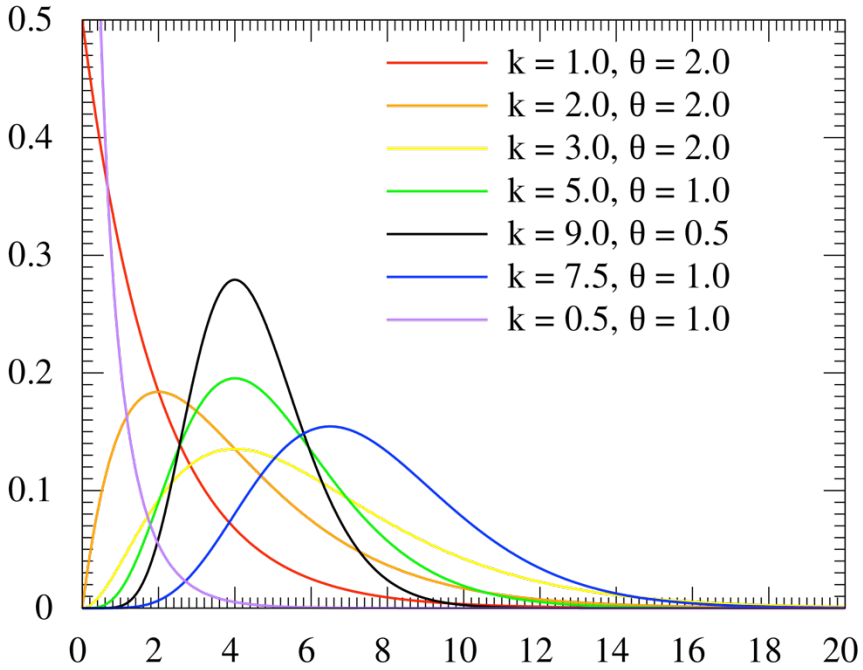
dgamma(t, k, theta)
pgamma(t, k, theta)
rgamma(t, k, theta)
qgamma(t, k, theta)
```

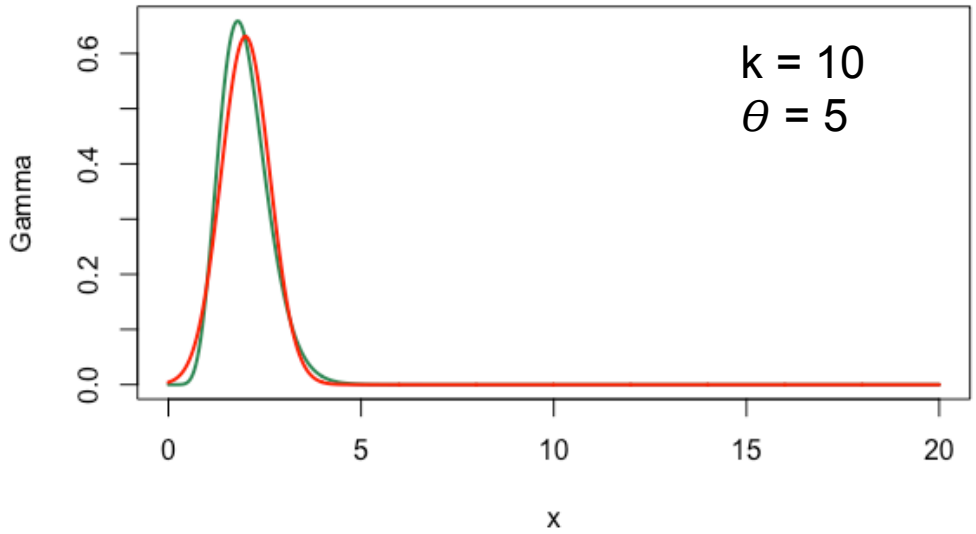
Example

Suppose you are fishing and you expect to get a fish once every 1/2 hour. Compute the probability that you will have to wait between 2 to 4 hours before you catch 4 fish.

Look at this Graph



Approximating the Gamma Distribution



Questions?