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Created, developed, and
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at Wolfram Research

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Erlang Distribution

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Given a [Poisson distribution](#) with a rate of change λ , the [distribution function](#) $D(x)$ giving the waiting times until the h th Poisson event is

$$D(x) = 1 - \sum_{k=0}^{h-1} e^{-\lambda x} \frac{(\lambda x)^k}{k!} \quad (1)$$

$$= 1 - \frac{\Gamma(h, x\lambda)}{\Gamma(h)} \quad (2)$$

for $x \in [0, \infty)$, where $\Gamma(x)$ is a complete [gamma function](#), and $\Gamma(a, x)$ an [incomplete gamma function](#). With h explicitly an integer, this distribution is known as the Erlang distribution, and has probability function

$$P(x) = \frac{\lambda (\lambda x)^{h-1}}{(h-1)!} e^{-\lambda x}. \quad (3)$$

It is closely related to the [gamma distribution](#), which is obtained by letting $\alpha \equiv h$ (not necessarily an integer) and defining $\theta \equiv 1/\lambda$. When $h = 1$, it simplifies to the [exponential distribution](#).

Evans *et al.* (2000, p. 71) write the distribution using the variables $b = 1/\lambda$ and $c = h$.

SEE ALSO:

[Exponential Distribution](#), [Gamma Distribution](#), [Poisson Distribution](#)

REFERENCES:

Evans, M.; Hastings, N.; and Peacock, B. "Erlang Distribution." Ch. 12 in *Statistical Distributions*, 3rd ed. New York: Wiley, pp. 71-73, 2000.

Referenced on Wolfram|Alpha: [Erlang Distribution](#)

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<http://mathworld.wolfram.com/ErlangDistribution.html>

erlang distribution



THINGS TO TRY:

= erlang distribution
= (2+3i)(5-i)
= d/dx Si(x)^2

Interactive knowledge apps from
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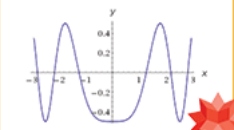


**Erlang B and
Telephony**
Jim Michael

Wolfram|Alpha Online Integral Calculator

integrate x sin(x^2)

$$\int x \sin(x^2) dx = -\frac{1}{2} \cos(x^2) + \text{constant}$$



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