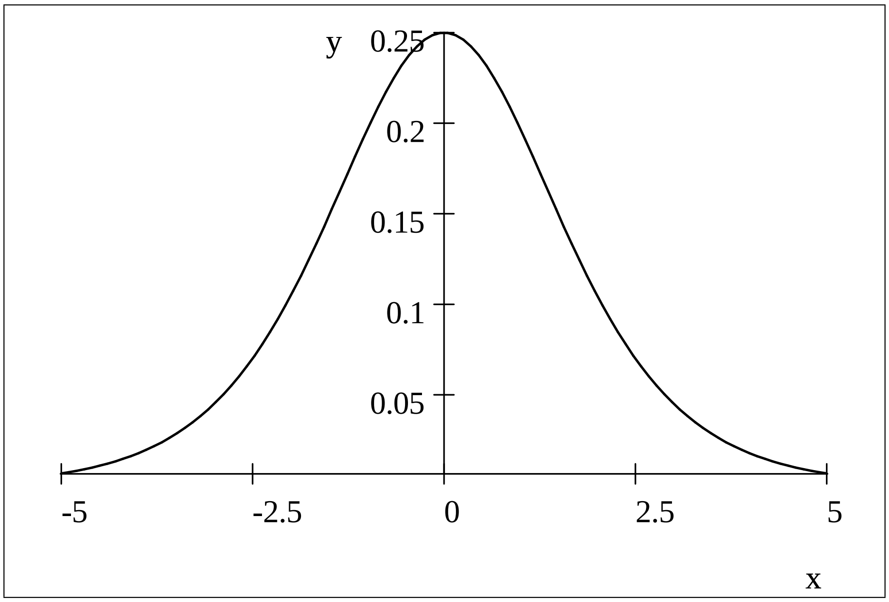
1 The logistic distribution

SimpleLogisticDistribution.tex September 20, 2006

A simple form of the logistic distribtion has the density function,

$f(\upsilon) = \frac{e^{-\upsilon}}{(1+e^{-\upsilon})^2}$



Note that this density function has no parameters.

$\int\limits_{-\infty}^{+\infty} (\frac{e^{-\upsilon}}{(1+e^{-\upsilon})^2}) d\upsilon = 1$:the area under the function is 1, so it is a density function.

$\int\limits_{-\infty}^{+\infty} (\frac{\upsilon e^{-\upsilon}}{(1+e^{-\upsilon})^2}) d\upsilon = 0$, is the mean.

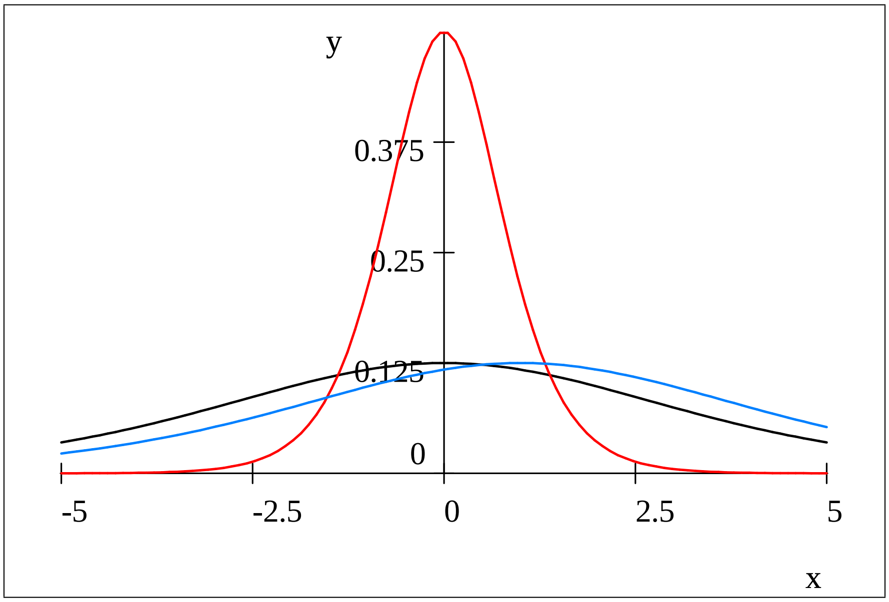
The cdf is
$F(\upsilon) = \frac{1}{1+e^{-\upsilon}}$

A more general form of the logistic density function is

$$f(\upsilon) = \frac{e^{-(\upsilon-\mu)/s}}{s(1+e^{-(\upsilon-\mu)/s})^2}$$

where $s > 0$

In the red and black graphs, $\mu = 0$, in the blue $\mu = 1$. In the black and blue graphs $s = 2$; in the red $s = .5$



For this density function can you show that the mean=mean=mode= μ, and that the variance is $\frac{\pi^2}{3}s^2$?

For more details, see, for example,
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