Exponential Power Distribution

$$f(x) = \mathrm{e}^{1-\mathrm{e}^{ax^b}}\mathrm{e}^{ax^b}abx^{b-1} \qquad x, a, b > 0$$

Transformation	General PDF	Example: ExponentialPower(2,3) PDF	CDF	HF	IDF	μ	σ^2	MF	MGF	HF Shape	Support	Comment
x^2	✓	✓	✓	✓	∂	∂	∂	∂	∂	Unique	$0, \infty$	Sinusoidal HF
$\sqrt{x}$	✓	✓	✓	✓	✓	∂	∂	∂	∂		$0, \infty$	
x^{-1}	✓	✓	✓	✓	✓	∂	∂	∂	∂	UBT	$0, \infty$	
$\arctan(x)$	✓	✓	✓	✓	∂	∂	∂	∂	∂		$0, \pi/2$	piecewise CDF
e^x	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$1, \infty$	
$\ln(x)$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$-\infty, \infty$	
e^{-x}	✓	✓	✓	✓		∂	∂	∂	∂	IFR	$0, 1$	
$-\ln(x)$	✓	✓	✓	✓	✓	∂	∂	∂	∂		$-\infty, \infty$	
$\ln(x+1)$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$0, \infty$	
$1/\ln(x+2)$	✓	✓	✓	✓		∂	∂	∂	∂	IFR	$0, 1/\ln(2)$	
$\tanh(x)$	✓	✓	✓	✓		∂	∂	∂	∂		$0, 1$	
$\sinh(x)$	✓	✓	✓	✓		∂	∂	∂	∂	IFR	$0, \infty$	
$\operatorname{arcsinh}(x)$	✓	✓	✓	✓	∂	∂	∂	∂	∂	IFR	$0, \infty$	
$\operatorname{csch}(x+1)$	✓	✓	∂	∂		∂	∂	∂	∂	IFR	$0, 2/(-\mathrm{e}+\mathrm{e}^{-1})$	
$\operatorname{arccsch}(x+1)$	✓	✓	✓	✓	✓					IFR	$0, \ln(1+\sqrt{2})$	
$1/\tanh(x+1)$	✓	✓	✓	✓		∂	∂	∂	∂	IFR	$1, (\mathrm{e}+\mathrm{e}^{-1})/(\mathrm{e}-\mathrm{e}^{-1})$	
1/sinh(x+1)	✓	✓	∂	∂		∂	∂	∂	∂	IFR	$2, 2/(\mathrm{e}-\mathrm{e}^{-1})$	
$1/\operatorname{arcsinh}(x+1)$	✓	✓	✓	✓						IFR	$0, 1/\ln(1+\sqrt{2})$	
$1/\operatorname{csch}(x)+1$	✓	✓	∂	∂		∂	∂	∂	∂		$1, \infty$	
$\tanh(x^{-1})$	✓	✓	∂	∂		∂	∂	∂	∂	IFR	$0, 1$	
$\operatorname{csch}(x^{-1})$	✓	✓	∂	∂		∂	∂	∂	∂		$1, \infty$	
$\operatorname{arccsch}(x^{-1})$	✓	✓	✓	✓	∂	∂	∂	∂	∂	IFR	$0, \infty$	

Legend

Symbol	Meaning
✓	Exists, Closed Form
∂	Exists, Not Closed Form
$\varnothing$	Not Possible
	Not Calculated