Log Logistic Distribution

$$f(x) = \frac{\frac{\beta}{\alpha}(\frac{x}{\alpha})^{\beta-1}}{1+(\frac{x}{\alpha})^{\beta}}$$

Transformation	General PDF	Example: Log Logistic (1,2) PDF	CDF	HF	IDF	μ	σ^2	MF	MGF	HF Shape	Support	Comment
x^2	✓	✓	✓	✓	✓	∞	U	✓	✓	DFR	$0, \infty$	
$\sqrt{x}$	✓	✓	✓	✓	✓	✓	✓	✓	✓	UBT	$0, \infty$	
x^{-1}	✓	✓	✓	✓	✓	✓	∞	✓	∂	UBT	$0, \infty$	
$\arctan(x)$	✓	✓	✓	✓	✓	✓	✓	✓	✓	IFR	$0, \frac{\pi}{2}$	
e^x	✓	✓	✓	✓	✓	∞	U	∞	∂	DFR	$1, \infty$	
$\ln(x)$	✓	✓	✓	✓	✓	✓	✓	∂	∂	IFR	$-\infty, \infty$	
e^{-x}	✓	✓	✓	✓	✓	✓	✓	✓	∂	IFR	$0, 1$	
$-\ln(x)$	✓	✓	✓	✓	✓	✓	✓	∂	∂	IFR	$-\infty, \infty$	
$\ln(x+1)$	✓	✓	✓	✓	✓	✓	✓	∂	∂	UBT	$0, \infty$	
$1/\ln(x+2)$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$0, \frac{1}{\ln(2)}$	
$\tanh(x)$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$0, 1$	
$\sinh(x)$	✓	✓	✓	✓	✓	∞	$\varnothing$	∞	∂	UBT	$0, \infty$	
$\text{arcsinh}(x)$	✓	✓	✓	✓	✓	✓	✓	∂	∂	IFR	$0, \infty$	
$\text{csch}(x+1)$	✓	✓	∂	∂		∂	∂	∂	∂		$0, \frac{2}{e-e^{-1}}$	
$\text{arccsch}(x+1)$	✓	✓	✓	✓	✓	✓	✓	∂	∂	IFR	$0, \text{arcsinh}(1)$	
$1/\tanh(x+1)$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$1, \frac{e+e^{-1}}{e-e^{-1}}$	
$1/\sinh(x+1)$	✓	✓	✓	✓		∂	∂	∂	∂	IFR	$0, \frac{2}{e-e^{-1}}$	
$1/\text{arcsinh}(x+1)$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$0, \frac{1}{\ln(1+\sqrt{2})}$	
$1/\text{csch}(x)+1$	✓	✓	∂	∂		∞	U	∞	∂	UBT	$1, \infty$	
$\tanh(x^{-1})$	✓	✓	✓	✓	✓	∂	∂	∂	∂	IFR	$0, 1$	
$\text{csch}(x^{-1})$	✓	✓	∂	∂		∂	∂	∂	∂		$0, \infty$	
$\text{arccsch}(x^{-1})$	✓	✓	✓	✓	✓	✓	✓	∂	∂	IFR	$0, \infty)$	

Legend

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