

# InverseGaussian Distribution

$$f(x) = 1/2\sqrt{2a/(\pi x^3)}e^{-(a(x-b)^2)/(2b^2x)} \quad x, a, b > 0$$

Transformation	General PDF	Example: InverseGaussian(2,3)										
		PDF	CDF	HF	IDF	$\mu$	$\sigma^2$	MF	MGF	HF Shape	Support	Comment
$x^2$	✓	✓	$\partial$	$\partial$		✓	✓	✓	$\partial$		$0, \infty$	
$\sqrt{x}$	✓	✓	$\partial$	$\partial$		✓	✓	$\partial$	$\partial$		$0, \infty$	
$x^{-1}$	✓	✓	✓	✓	$\partial$	✓	✓	$\partial$	$\partial$	UBT	$0, \infty$	
$\arctan(x)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$	IFR	$0, \pi/2$	
$e^x$	✓	✓	$\partial$	$\partial$		$\infty$	✓	$\infty$	$\partial$		$1, \infty$	
$\ln(x)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$-\infty, \infty$	
$e^{-x}$	✓	✓	$\partial$	$\partial$		✓	✓	✓	$\partial$		$0, 1$	
$-\ln(x)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$-\infty, \infty$	
$\ln(x+1)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$0, \infty$	
$1/\ln(x+2)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$0, 1/\ln(2)$	
$\tanh(x)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$	IFR	$0, 1$	
$\sinh(x)$	✓	✓	$\partial$	✓		$\infty$	✓	$\infty$	$\partial$		$0, \infty$	
$\operatorname{arcsinh}(x)$	✓	✓				$\partial$	$\partial$	$\partial$	$\partial$		$0, \infty$	
$\operatorname{csch}(x+1)$	✓	✓									$0, 2/(-e+e^{-1})$	
$\operatorname{arccsch}(x+1)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$0, \ln(1+\sqrt{2})$	
$1/\tanh(x+1)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$1, (e+e^{-1})/(e-e^{-1})$	
$1/\sinh(x+1)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$2, 2/(e-e^{-1})$	
$1/\operatorname{arcsinh}(x+1)$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$0, 1/\ln(1+\sqrt{2})$	
$1/\operatorname{csch}(x)+1$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$1, \infty$	
$\tanh(x^{-1})$	✓	✓	$\partial$	$\partial$		$\partial$	$\partial$	$\partial$	$\partial$		$0, 1$	
$\operatorname{csch}(x^{-1})$	✓	✓	$\partial$	$\partial$							$1, \infty$	
$\operatorname{arccsch}(x^{-1})$	✓	✓		✓		$\partial$	$\partial$	$\partial$	$\partial$		$0, \infty$	

## Legend

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