```
> restart;
  read("c:/appl/appl7.txt");
```

PROCEDURES:

AllPermutations(n), AllCombinations(n, k), Benford(X), BootstrapRV(Data), CDF:CHF:HF:IDF:PDF:SF(X, [x])), CoefOfVar(X), Convolution(X, Y), ConvolutionIID(X, n), CriticalPoint(X, prob), Determinant(MATRIX), Difference(X, Y), Display(X), ExpectedValue(X, [g]), KSTest(X, Data, Parameters), Kurtosis(X), Maximum(X, Y), MaximumIID(X, n), Mean(X), MGF(X), Minimum(X, Y), MinimumIID(X, n), Mixture(MixParameters, MixRVs), MLE(X, Data, Parameters, [Rightcensor]), MLENHPP(X, Data, Parameters, obstime), MLEWeibull(Data, [Rightcensor]), MOM(X, Data, Parameters), NextCombination(Previous, size), NextPermutation(Previous), OrderStat(X, n, r, ["wo"]), PlotDist(X, [low], [high]), PlotEmpCDF(Data, [low], [high]), PlotEmpCIF(Data, [low], [high]), PlotEmpSF(Data, Censor), PlotEmpVsFittedCDF(X, Data, Parameters, [low], [high]), PlotEmpVsFittedCDF(X, Data, Parameters, [low], [high]), PlotEmpVsFittedSF(X, Data, Parameters, Censor, low, high), PPPlot(X, Data, Parameters), Product(X, Y), ProductIID(X, n), QQPlot(X, Data, Parameters), RangeStat(X, n, ["wo"]), Skewness(X), Transform(X, g), Truncate(X, low, high), Variance(X), VerifyPDF(X)

Procedure Notation:
X and Y are random variables
Greek letters are numeric or symbolic parameters
x is numeric or symbolic
n and r are positive integers, n >= r
low and high are numeric
g is a function
Brackets [] denote optional parameters
"double quotes" denote character strings
MATRIX is a 2 x 2 array of random variables
A capitalized parameter indicates that it must be entered as a list --> ex. Data := [1, 12.4, 34, 52.45, 63]

Variate Generation:

ArcTanVariate(alpha, phi), BinomialVariate(n, p, m), ExponentialVariate(lambda), NormalVariate(mu, sigma), UniformVariate(), WeibullVariate(lambda, kappa, m)

DATA SETS:

BallBearing, HorseKickFatalities, Hurricane, MP6, RatControl, RatTreatment, USSHalfBeak

ArcSinRV(), ArcTanRV(alpha, phi), BetaRV(alpha, beta), CauchyRV(a, alpha), ChiRV(n), *ChiSquareRV(n), ErlangRV(lambda, n), ErrorRV(mu, alpha, d), ExponentialRV(lambda), ExponentialPowerRV(lambda, kappa), ExtremeValueRV(alpha, beta), FRV(n1, n2), GammaRV(lambda, kappa), GeneralizedParetoRV(gamma, delta, kappa), GompertzRV(delta, kappa), HyperbolicSecantRV(), HyperExponentialRV(p, l), HypoExponentialRV(l), IDBRV(gamma, delta, kappa), InverseGaussianRV(lambda, mu), InvertedGammaRV(alpha, beta), KSRV(n), LaPlaceRV(omega, theta), LogGammaRV(alpha, beta), LogisticRV(kappa, lambda), LogLogisticRV(lambda, kappa), LogNormalRV(mu, sigma), LomaxRV(kappa, lambda), MakehamRV(gamma, delta, kappa), MuthRV(kappa), NormalRV(mu, sigma), ParetoRV(lambda, kappa), RayleighRV(lambda), StandardCauchyRV(), StandardNormalRV(), StandardTriangularRV(m), StandardUniformRV(), TRV(n), TriangularRV(a, m, b), UniformRV(a, b), WeibullRV(lambda, kappa)*

```
Error, attempting to assign to `DataSets` which is protected.  
Try declaring `local DataSets`; see ?protect for details.
```

```
> bf := LogNormalRV(a,b);
  bfname := "LogNormalRV(a,b)";
Originally b, renamed b~:
  is assumed to be: RealRange(Open(0),infinity)
```

$$bf := \left[\left[x \to \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x)-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,x\,b\sim}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

$$bfname := \text{"LogNormalRV(a,b)"} \tag{1}$$

```
> #plot(1/csch(t)+1, t = 0..0.0010);
  #plot(diff(1/csch(t),t), t=0..0.0010);
  #limit(1/csch(t), t=0);
> solve(exp(-t) = y, t);
```

$$-\ln(y) \tag{2}$$

```
> # discarded  -ln(t + 1),  t-> csch(t),t->arccsch(t),t -> tan(t),
> #name of the file for latex output
  filename := "C:/Latex_Output_2/LogNormal_Gen.tex";


  glist := [t -> t^2 , t -> sqrt(t),  t -> 1/t,  t -> arctan(t),  t
  -> exp(t), t -> ln(t), t -> exp(-t), t -> -ln(t),  t -> ln(t+1),
  t -> 1/(ln(t+2)), t -> tanh(t), t -> sinh(t), t -> arcsinh(t),
  t-> csch(t+1),t->arccsch(t+1), t-> 1/tanh(t+1), t->  1/sinh(t+1),
   t->  1/arcsinh(t+1), t->  1/csch(t)+1, t-> tanh(1/t), t->csch
  (1/t), t-> arccsch(1/t), t-> arctanh(1/t)  ]:

  base := t -> PDF(bf, t):

  print(base(x)):
```

```
#begin latex file formatting
appendto(filename);
  printf("\\documentclass[12pt]{article} \n");
  printf("\\usepackage{amsfonts} \n");
  printf("\\begin{document} \n");
  print(bfname);
  printf("$$");
  latex(bf[1]);
  printf("$$");
writeto(terminal);

#begin loopint through transformations
for i from 1 to 22 do
#for i from 1 to 3 do
   print( "i is", i, "  -----------------------------------------
-----------------------------------------------------------------
-------------");

   g := glist[i]:
   l := bf[2][1];
   u := bf[2][2];
   Temp := Transform(bf, [[unapply(g(x), x)],[l,u]]);

  #terminal output
  print( "l and u", l, u );
  print("g(x)", g(x), "base", base(x),bfname);
  print("f(x)", PDF(Temp, x));



  #latex output
  appendto(filename);
  printf("-------------------------------------------------
-------------------------------------  \\\\");
  printf("$$");
  latex(glist[i]);
  printf("$$");
  printf("Probability Distribution Function \n$$  f(x)=");
  latex(PDF(Temp,x));
  printf(" \\qquad");
  latex(Temp[2][1]);
  printf(" < x < ");
  latex(Temp[2][2]);
  printf("$$");



  writeto(terminal);


od;

#final latex output
appendto(filename);
printf("\\end{document}\n");
writeto(terminal);
```

$$filename := \text{"C:/Latex\_Output\_2/LogNormal\_Gen.tex"}$$

$$\frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}$$

"i is", 1,

" --
----------"

$$g := t \rightarrow t^2$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{4} \frac{\sqrt{2}\, e^{-\frac{1}{8} \frac{(\ln(y\sim) - 2\, a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, y\sim\, b\sim}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

"g(x)", x^2, "base", $\frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}$, "LogNormalRV(a,b)"

"f(x)", $\frac{1}{4} \frac{\sqrt{2}\, e^{-\frac{1}{8} \frac{(\ln(x) - 2\, a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}$

"i is", 2,

" --
----------"

$$g := t \rightarrow \sqrt{t}$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{\left(\ln\left(y\sim^2\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\, y\sim\, b\sim}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

"g(x)", $\sqrt{x}$, "base", $\frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}$, "LogNormalRV(a,b)"

"f(x)", $\frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{\left(\ln\left(x^2\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}$

"i is", 3,

" --
----------"

$$g := t \to \frac{1}{t}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\left(\ln\left(\frac{1}{y\sim}\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\, y\sim\, b\sim}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

$$\text{"g(x)"}, \frac{1}{x}, \text{"base"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\left(\ln\left(\frac{1}{x}\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}$$

"i is", 4,

" --
----------"

$$g := t \to \arctan(t)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(\tan(y\sim)) - a\sim)^2}{b\sim^2}} \left(1 + \tan(y\sim)^2\right)}{\sqrt{\pi}\, \tan(y\sim)\, b\sim}\right], \left[0, \frac{1}{2}\pi\right], [\text{"Continuous"},$$

$$\text{"PDF"}]\Bigg]$$

"l and u", 0, ∞

$$\text{"g(x)"}, \arctan(x), \text{"base"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(\tan(x)) - a\sim)^2}{b\sim^2}} \left(1 + \tan(x)^2\right)}{\sqrt{\pi}\, \tan(x)\, b\sim}$$

"i is", 5,

" --"

$$g := t \to e^{t}$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \to \frac{1}{2}\,\frac{\sqrt{2}\,e^{-\frac{1}{2}\,\frac{(\ln(\ln(y\sim)) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,\ln(y\sim)\,b\sim\,y\sim}\right], [1, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, e^{x}, \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,e^{-\frac{1}{2}\,\frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$
$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\,e^{-\frac{1}{2}\,\frac{(\ln(\ln(x)) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,\ln(x)\,b\sim\,x}$$

"i is", 6,

" --"

$$g := t \to \ln(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \to \frac{1}{2}\,\frac{\sqrt{2}\,e^{-\frac{1}{2}\,\frac{(-y\sim + a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,b\sim}\right], [-\infty, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, \ln(x), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,e^{-\frac{1}{2}\,\frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$
$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\,e^{-\frac{1}{2}\,\frac{(-x + a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,b\sim}$$

"i is", 7,

" --"

$$g := t \to e^{-t}$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow -\frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(-\ln(y\sim))-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;\ln(y\sim)\;b\sim\,y\sim}\right], [0, 1], [\text{"Continuous"}, \text{"PDF"}]\right]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \mathrm{e}^{-x}, \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x)-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;x\,b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, -\frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(-\ln(x))-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;\ln(x)\;b\sim\,x}$$

"i is", 8,

" --"

$$g := t \rightarrow -\ln(t)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(y\sim+a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;b\sim}\right], [-\infty, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, -\ln(x), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x)-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;x\,b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(x+a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;b\sim}$$

"i is", 9,

" --"

$$g := t \rightarrow \ln(t+1)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{-2\,y\sim\,b\sim^2+\ln(\mathrm{e}^{y\sim}-1)^2-2\ln(\mathrm{e}^{y\sim}-1)\,a\sim+a\sim^2}{b\sim^2}}}{\sqrt{\pi}\;(\mathrm{e}^{y\sim}-1)\;b\sim}\right], [0, \infty],\right.$$

$$["\text{Continuous}", "\text{PDF}"]$$

$$"\text{l and u}", 0, \infty$$

$$"\text{g(x)}", \ln(x+1), "\text{base}", \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, "\text{LogNormalRV(a,b)"}$$

$$"\text{f(x)}", \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{-2 x b\sim^2 + \ln(\mathrm{e}^x - 1)^2 - 2\ln(\mathrm{e}^x - 1)\, a\sim + a\sim^2}{b\sim^2}}}{\sqrt{\pi}\, (\mathrm{e}^x - 1)\, b\sim}$$

"i is", 10,

" --"

$$g := t \rightarrow \frac{1}{\ln(t+2)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\ln\left(\mathrm{e}^{\frac{1}{y\sim}} - 2\right)^2 y\sim - 2\ln\left(\mathrm{e}^{\frac{1}{y\sim}} - 2\right) a\sim y\sim + a\sim^2 y\sim - 2 b\sim^2}{b\sim^2 y\sim}}}{\sqrt{\pi}\left(\mathrm{e}^{\frac{1}{y\sim}} - 2\right) b\sim y\sim^2}\right], \left[0, \frac{1}{\ln(2)}\right],\right.$$

$$["\text{Continuous}", "\text{PDF}"]$$

$$"\text{l and u}", 0, \infty$$

$$"\text{g(x)}", \frac{1}{\ln(x+2)}, "\text{base}", \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, "\text{LogNormalRV(a,b)"}$$

$$"\text{f(x)}", \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\ln\left(\mathrm{e}^{\frac{1}{x}} - 2\right)^2 x - 2\ln\left(\mathrm{e}^{\frac{1}{x}} - 2\right) a\sim x + a\sim^2 x - 2 b\sim^2}{b\sim^2 x}}}{\sqrt{\pi}\left(\mathrm{e}^{\frac{1}{x}} - 2\right) b\sim x^2}$$

"i is", 11,

" --"

$$g := t \to \tanh(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \to -\frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(\operatorname{arctanh}(y\sim))-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,\operatorname{arctanh}(y\sim)\,b\sim\,(y\sim^2-1)}\right], [0, 1], [\text{"Continuous"}, \text{"PDF"}]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, \tanh(x), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(x)-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$
$$\text{"f(x)"}, -\frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(\operatorname{arctanh}(x))-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,\operatorname{arctanh}(x)\,b\sim\,(x^2-1)}$$

"i is", 12,
" ---"

$$g := t \to \sinh(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \to \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(\operatorname{arcsinh}(y\sim))-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,\operatorname{arcsinh}(y\sim)\,b\sim\,\sqrt{y\sim^2+1}}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, \sinh(x), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(x)-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$
$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(\operatorname{arcsinh}(x))-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,\operatorname{arcsinh}(x)\,b\sim\,\sqrt{x^2+1}}$$

"i is", 13,
" ---"

$$g := t \to \operatorname{arcsinh}(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \to \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\frac{(\ln(\sinh(y\sim))-a\sim)^2}{b\sim^2}}\cosh(y\sim)}{\sqrt{\pi}\,\sinh(y\sim)\,b\sim}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

$$"l and u", 0, \infty$$

$$"g(x)", \operatorname{arcsinh}(x), "base", \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, "LogNormalRV(a,b)"$$

$$"f(x)", \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(\sinh(x)) - a\sim)^2}{b\sim^2}} \cosh(x)}{\sqrt{\pi}\, \sinh(x)\, b\sim}$$

"i is", 14,
" --"

$$g := t \rightarrow \operatorname{csch}(t+1)$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(-1 + \operatorname{arccsch}(y\sim)) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi} \sqrt{y\sim^2 + 1}\, (-1 + \operatorname{arccsch}(y\sim))\, b\sim\, |y\sim|}\right], \left[0, \frac{2}{e - e^{-1}}\right], \right.$$
$$\left. ["Continuous", "PDF"]\right]$$

$$"l and u", 0, \infty$$

$$"g(x)", \operatorname{csch}(x+1), "base", \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, "LogNormalRV(a,b)"$$

$$"f(x)", \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{(\ln(-1 + \operatorname{arccsch}(x)) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi} \sqrt{x^2 + 1}\, (-1 + \operatorname{arccsch}(x))\, b\sim\, |x|}$$

"i is", 15,
" --"

$$g := t \rightarrow \operatorname{arccsch}(t+1)$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow -\frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2} \frac{\left(\ln\left(-\frac{\sinh(y\sim) - 1}{\sinh(y\sim)}\right) - a\sim\right)^2}{b\sim^2}} \cosh(y\sim)}{\sqrt{\pi}\, b\sim \sinh(y\sim)\, (\sinh(y\sim) - 1)}\right], \left[0, \ln\left(1 + \sqrt{2}\right)\right], \right.$$

$$["Continuous", "PDF"]\Bigg]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \operatorname{arccsch}(x+1), \text{"base"}, \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2}\frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, -\frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2}\frac{\left(\ln\left(-\frac{\sinh(x)-1}{\sinh(x)}\right) - a\sim\right)^2}{b\sim^2}} \cosh(x)}{\sqrt{\pi}\, b\sim \sinh(x)\, (\sinh(x) - 1)}$$

"i is", 16,
" --
----------"

$$g := t \rightarrow \frac{1}{\tanh(t+1)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2}\frac{\left(\ln\left(-1 + \operatorname{arctanh}\left(\frac{1}{y\sim}\right)\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\left(-1 + \operatorname{arctanh}\left(\frac{1}{y\sim}\right)\right) b\sim\, (y\sim^2 - 1)}\right], \left[1, \frac{e + e^{-1}}{e - e^{-1}}\right],\right.$$

$$["Continuous", "PDF"]\Bigg]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \frac{1}{\tanh(x+1)}, \text{"base"}, \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2}\frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2} \frac{\sqrt{2}\, e^{-\frac{1}{2}\frac{\left(\ln\left(-1 + \operatorname{arctanh}\left(\frac{1}{x}\right)\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\left(-1 + \operatorname{arctanh}\left(\frac{1}{x}\right)\right) b\sim\, (x^2 - 1)}$$

"i is", 17,
" --

----------"

$$g := t \to \frac{1}{\sinh(t+1)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{\left(\ln\left(-1+\operatorname{arcsinh}\left(\frac{1}{y\sim}\right)\right)-a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\,\sqrt{y\sim^2+1}\,\left(-1+\operatorname{arcsinh}\left(\frac{1}{y\sim}\right)\right)\,b\sim\,|y\sim|}\right],\left[0,\frac{2}{\mathrm{e}-\mathrm{e}^{-1}}\right],\right.$$

$$\left.[\text{"Continuous"}, \text{"PDF"}]\right]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \frac{1}{\sinh(x+1)}, \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x)-a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{\left(\ln\left(-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)\right)-a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\,\sqrt{x^2+1}\,\left(-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)\right)\,b\sim\,|x|}$$

"i is", 18,
" --
----------"

$$g := t \to \frac{1}{\operatorname{arcsinh}(t+1)}$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{\left(\ln\left(-1+\sinh\left(\frac{1}{y\sim}\right)\right)-a\sim\right)^2}{b\sim^2}}\cosh\left(\frac{1}{y\sim}\right)}{\sqrt{\pi}\,\left(-1+\sinh\left(\frac{1}{y\sim}\right)\right)\,b\sim\,y\sim^2}\right],\left[0,\frac{1}{\ln\left(1+\sqrt{2}\right)}\right],\right.$$

$$\left.[\text{"Continuous"}, \text{"PDF"}]\right]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \frac{1}{\operatorname{arcsinh}(x+1)}, \text{"base"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\left(\ln\left(-1+\sinh\left(\frac{1}{x}\right)\right) - a\sim\right)^2}{b\sim^2}} \cosh\left(\frac{1}{x}\right)}{\sqrt{\pi}\left(-1+\sinh\left(\frac{1}{x}\right)\right) b\sim x^2}$$

"i is", 19,

" ---"

$$g := t \rightarrow \frac{1}{\operatorname{csch}(t)} + 1$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[\left[y\sim \rightarrow \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\left(\ln\left(\operatorname{arccsch}\left(\frac{1}{y\sim - 1}\right)\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\sqrt{y\sim^2 - 2\, y\sim + 2}\, \operatorname{arccsch}\left(\frac{1}{y\sim - 1}\right) b\sim}\right], [1, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]\right]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \frac{1}{\operatorname{csch}(x)} + 1, \text{"base"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\, x\, b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2} \frac{\sqrt{2}\, \mathrm{e}^{-\frac{1}{2} \frac{\left(\ln\left(\operatorname{arccsch}\left(\frac{1}{x-1}\right)\right) - a\sim\right)^2}{b\sim^2}}}{\sqrt{\pi}\sqrt{x^2 - 2\, x + 2}\, \operatorname{arccsch}\left(\frac{1}{x-1}\right) b\sim}$$

"i is", 20,

" ---"

$$g := t \rightarrow \tanh\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow -\frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{\left(\ln\left(\frac{1}{\operatorname{arctanh}(y\sim)}\right)-a\sim\right)^{2}}{b\sim^{2}}}}{\sqrt{\pi}\,\operatorname{arctanh}(y\sim)\,b\sim\,\left(y\sim^{2}-1\right)}\right], [0, 1], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

$$\text{"g(x)"}, \tanh\left(\frac{1}{x}\right), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x)-a\sim)^{2}}{b\sim^{2}}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, -\frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{\left(\ln\left(\frac{1}{\operatorname{arctanh}(x)}\right)-a\sim\right)^{2}}{b\sim^{2}}}}{\sqrt{\pi}\,\operatorname{arctanh}(x)\,b\sim\,\left(x^{2}-1\right)}$$

"i is", 21,

" --"

$$g := t \rightarrow \operatorname{csch}\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(\operatorname{arccsch}(y\sim))+a\sim)^{2}}{b\sim^{2}}}}{\sqrt{\pi}\,\sqrt{y\sim^{2}+1}\,\operatorname{arccsch}(y\sim)\,b\sim\,|y\sim|}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

$$\text{"g(x)"}, \operatorname{csch}\left(\frac{1}{x}\right), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x)-a\sim)^{2}}{b\sim^{2}}}}{\sqrt{\pi}\,x\,b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\,\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(\operatorname{arccsch}(x))+a\sim)^{2}}{b\sim^{2}}}}{\sqrt{\pi}\,\sqrt{x^{2}+1}\,\operatorname{arccsch}(x)\,b\sim\,|x|}$$

"i is", 22,

" --"

$$g := t \rightarrow \operatorname{arccsch}\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(\sinh(y\sim)) - a\sim)^2}{b\sim^2}}\cosh(y\sim)}{\sqrt{\pi}\;b\sim\sinh(y\sim)}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

$$\text{"l and u"}, 0, \infty$$

$$\text{"g(x)"}, \operatorname{arccsch}\left(\frac{1}{x}\right), \text{"base"}, \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(x) - a\sim)^2}{b\sim^2}}}{\sqrt{\pi}\;x\,b\sim}, \text{"LogNormalRV(a,b)"}$$

$$\text{"f(x)"}, \frac{1}{2}\,\frac{\sqrt{2}\;\mathrm{e}^{-\frac{1}{2}\,\frac{(\ln(\sinh(x)) - a\sim)^2}{b\sim^2}}\cosh(x)}{\sqrt{\pi}\;b\sim\sinh(x)} \tag{3}$$