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

Originally b, renamed b~:
  is assumed to be: RealRange(Open(0),infinity)
```

$$bf := \left[\left[x \to e^{1 - e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim - 1}\right], [0, \infty], ["\text{Continuous}", "\text{PDF}"]\right]$$

$$bfname := \text{"ExponentialPowerRV(a,b)"} \quad \textbf{(1)}$$

```
> #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);
```

$$-\ln(y) \quad \textbf{(2)}$$

```
> # discarded  -ln(t + 1),  t-> csch(t),t->arccsch(t),t -> tan(t),
> #name of the file for latex output
  filename := "C:/LatexOutput/ExponentialPower_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$$  f(x)=");
  latex(PDF(Temp,x));
  printf("$$");



  writeto(terminal);


od;

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

filename := "C:/LatexOutput/ExponentialPower_Gen.tex"

$$e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim\, b\sim\, x^{b\sim-1}$$

"i is", 1,

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

$$g := t \to t^2$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{2}\, e^{1-e^{a\sim y\sim^{\frac{1}{2}\, b\sim}}+a\sim y\sim^{\frac{1}{2}\, b\sim}}\, a\sim\, b\sim\, y\sim^{\frac{1}{2}\, b\sim-1}\right], [0,\ \infty], ["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

"g(x)", x^2, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim\, b\sim\, x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

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

"i is", 2,

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

$$g := t \to \sqrt{t}$$

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

"g(x)", $\sqrt{x}$, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim\, b\sim\, x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

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

"i is", 3,

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

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

"g(x)", $\frac{1}{x}$, "base", $e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

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

"i is", 4,

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

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

$l := 0$

$u := \infty$

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

$\left.\left["Continuous", "PDF"\right]\right]$

"l and u", 0, ∞

"g(x)", $\arctan(x)$, "base", $e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

"f(x)", $e^{1-e^{a\sim \tan(x)^{b\sim}}+a\sim \tan(x)^{b\sim}} a\sim b\sim \tan(x)^{b\sim-1}\left(1+\tan(x)^2\right)$

"i is", 5,

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

$g := t \to e^t$

$l := 0$

$u := \infty$

$Temp := \left[\left[y\sim \to \frac{e^{1-e^{a\sim \ln(y\sim)^{b\sim}}+a\sim \ln(y\sim)^{b\sim}} a\sim b\sim \ln(y\sim)^{b\sim-1}}{y\sim}\right], [1, \infty], \right.$

$\left.["Continuous", "PDF"]\right]$

"l and u", 0, ∞

"g(x)", e^x, "base", $e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

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

"i is", 6,

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

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

$l := 0$

$u := \infty$

$$Temp := \left[\left[y\sim \to e^{a\sim e^{b\sim y\sim} + b\sim y\sim} - e^{a\sim e^{b\sim y\sim}} + 1\ a\sim b\sim\right], [-\infty, \infty], ["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

"g(x)", $\ln(x)$, "base", $e^{1 - e^{a\sim x^{b\sim}}}\ e^{a\sim x^{b\sim}}\ a\sim b\sim x^{b\sim - 1}$, "ExponentialPowerRV(a,b)"

"f(x)", $e^{a\sim e^{b\sim x} + b\sim x} - e^{a\sim e^{b\sim x}} + 1\ a\sim b\sim$

"i is", 7,

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

$$g := t \to e^{-t}$$

$$l := 0$$

$$u := \infty$$

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

$$\left.["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

"g(x)", e^{-x}, "base", $e^{1 - e^{a\sim x^{b\sim}}}\ e^{a\sim x^{b\sim}}\ a\sim b\sim x^{b\sim - 1}$, "ExponentialPowerRV(a,b)"

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

"i is", 8,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to e^{a\sim e^{-b\sim y\sim} - b\sim y\sim} - e^{a\sim e^{-b\sim y\sim}} + 1\ a\sim b\sim\right], [-\infty, \infty], ["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

"g(x)", $-\ln(x)$, "base", $e^{1 - e^{a\sim x^{b\sim}}}\ e^{a\sim x^{b\sim}}\ a\sim b\sim x^{b\sim - 1}$, "ExponentialPowerRV(a,b)"

"f(x)", $e^{a\sim e^{-b\sim x} - b\sim x} - e^{a\sim e^{-b\sim x}} + 1\ a\sim b\sim$

"i is", 9,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to e^{1 - e^{a\sim (e^{y\sim} - 1)^{b\sim}} + a\sim (e^{y\sim} - 1)^{b\sim} + y\sim}\ a\sim b\sim (e^{y\sim} - 1)^{b\sim - 1}\right], [0, \infty],\right.$$

["Continuous", "PDF"]]

"l and u", 0, ∞

"g(x)", $\ln(x+1)$, "base", $e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

"f(x)", $e^{1-e^{a\sim(e^x-1)^{b\sim}}+a\sim(e^x-1)^{b\sim}+x} a\sim b\sim (e^x-1)^{b\sim-1}$

"i is", 10,

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

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

"i is", 11,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to -\frac{e^{1-e^{a\sim \operatorname{arctanh}(y\sim)^{b\sim}}+a\sim \operatorname{arctanh}(y\sim)^{b\sim}} a\sim b\sim \operatorname{arctanh}(y\sim)^{b\sim-1}}{y\sim^2-1}\right], [0, 1], ["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

"g(x)", $\tanh(x)$, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

"f(x)", $-\dfrac{e^{1-e^{a\sim \operatorname{arctanh}(x)^{b\sim}}+a\sim \operatorname{arctanh}(x)^{b\sim}}\, a\sim b\sim \operatorname{arctanh}(x)^{b\sim-1}}{x^2-1}$

"i is", 12,

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

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

$$l := 0$$

$$u := \infty$$

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

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

"l and u", 0, ∞

"g(x)", $\sinh(x)$, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

"f(x)", $\dfrac{e^{1-e^{a\sim \operatorname{arcsinh}(x)^{b\sim}}+a\sim \operatorname{arcsinh}(x)^{b\sim}}\, a\sim b\sim \operatorname{arcsinh}(x)^{b\sim-1}}{\sqrt{x^2+1}}$

"i is", 13,

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

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

$$l := 0$$

$$u := \infty$$

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

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

"l and u", 0, ∞

"g(x)", $\operatorname{arcsinh}(x)$, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

"f(x)", $e^{1-e^{a\sim \sinh(x)^{b\sim}}+a\sim \sinh(x)^{b\sim}}\, a\sim b\sim \sinh(x)^{b\sim-1}\cosh(x)$

"i is", 14,

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

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

"g(x)", $\operatorname{csch}(x+1)$, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

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

"i is", 15,

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

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

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

"l and u", 0, ∞

"g(x)", $\operatorname{arccsch}(x+1)$, "base", $e^{1-e^{a\sim x^{b\sim}}}\, e^{a\sim x^{b\sim}}\, a\sim b\sim x^{b\sim-1}$, "ExponentialPowerRV(a,b)"

"f(x)", $-\frac{a\sim b\sim e^{1-e^{a\sim\left(-\frac{\sinh(x)-1}{\sinh(x)}\right)^{b\sim}}+a\sim\left(-\frac{\sinh(x)-1}{\sinh(x)}\right)^{b\sim}}\left(-\frac{\sinh(x)-1}{\sinh(x)}\right)^{b\sim}\cosh(x)}{(\sinh(x)-1)\sinh(x)}$

"i is", 16,

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

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

$$l := 0$$

$$u := \infty$$

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

$$\left.\left., \left[1, \frac{e+e^{-1}}{e-e^{-1}}\right], [\text{"Continuous"}, \text{"PDF"}]\right]\right]$$

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

$$\text{"g(x)"}, \frac{1}{\tanh(x+1)}, \text{"base"}, e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}, \text{"ExponentialPowerRV(a,b)"}$$

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

"i is", 17,

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

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

$$l := 0$$

$$u := \infty$$

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

$$\left[\left[0,\ \frac{2}{e - e^{-1}}\right],\ [\text{"Continuous"},\ \text{"PDF"}]\right]$$

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

$$\text{"g(x)"},\ \frac{1}{\sinh(x+1)},\ \text{"base"},\ e^{1-e^{a\sim x^{b\sim}}}\ e^{a\sim x^{b\sim}}\ a\sim\ b\sim\ x^{b\sim-1},\ \text{"ExponentialPowerRV(a,b)"}$$

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

$$\text{"i is"},\ 18,$$

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"},\ \frac{1}{\operatorname{arcsinh}(x+1)},\ \text{"base"},\ e^{1-e^{a\sim x^{b\sim}}}\ e^{a\sim x^{b\sim}}\ a\sim\ b\sim\ x^{b\sim-1},\ \text{"ExponentialPowerRV(a,b)"}$$

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

$$\text{"i is"},\ 19,$$

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

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

$$l := 0$$

$$u := \infty$$

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

$$\left. [1, \infty], ["\text{Continuous}", "\text{PDF}"] \right]$$

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

$$"\text{g(x)}", \frac{1}{\operatorname{csch}(x)} + 1, "\text{base}", e^{1 - e^{a\sim x^{b\sim}} e^{a\sim x^{b\sim}}} a\sim b\sim x^{b\sim - 1}, "\text{ExponentialPowerRV(a,b)}"$$

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

"i is", 20,

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

$$"\text{g(x)}", \tanh\left(\frac{1}{x}\right), "\text{base}", e^{1 - e^{a\sim x^{b\sim}} e^{a\sim x^{b\sim}}} a\sim b\sim x^{b\sim - 1}, "\text{ExponentialPowerRV(a,b)}"$$

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

"i is", 21,

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

$$"\text{g(x)}", \operatorname{csch}\left(\frac{1}{x}\right), "\text{base}", e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}, "\text{ExponentialPowerRV(a,b)}"$$

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

"i is", 22,

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

$$"\text{g(x)}", \operatorname{arccsch}\left(\frac{1}{x}\right), "\text{base}", e^{1-e^{a\sim x^{b\sim}}} e^{a\sim x^{b\sim}} a\sim b\sim x^{b\sim-1}, "\text{ExponentialPowerRV(a,b)}"$$

$$"\text{f(x)}", e^{1-e^{a\sim \sinh(x)^{b\sim}}+a\sim \sinh(x)^{b\sim}} a\sim b\sim \sinh(x)^{b\sim-1} \cosh(x)$$

(3)