```
> 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 := InvertedGammaRV(a,b);
  bfname := "InvertedGammaRV(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)
```

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

$$bfname := "InvertedGammaRV(a,b)" \quad (1)$$

```
> #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);
```

$$-\ln(y) \quad (2)$$

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

$$filename := \text{"C:/LatexOutput/InvertedGamma\_Gen.tex"}$$

$$\frac{x^{-a\sim-1}\, \mathrm{e}^{-\frac{1}{x\, b\sim}}}{\Gamma(a\sim)\, b\sim^{a\sim}}$$

"i is", 1,
" --
----------"

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

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

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

$$\text{"g(x)"}, x^2, \text{"base"}, \frac{x^{-a\sim-1}\, \mathrm{e}^{-\frac{1}{x\, b\sim}}}{\Gamma(a\sim)\, b\sim^{a\sim}}, \text{"InvertedGammaRV(a,b)"}$$

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

"i is", 2,
" --
----------"

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

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

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

$$\text{"g(x)"}, \sqrt{x}, \text{"base"}, \frac{x^{-a\sim-1}\, \mathrm{e}^{-\frac{1}{x\, b\sim}}}{\Gamma(a\sim)\, b\sim^{a\sim}}, \text{"InvertedGammaRV(a,b)"}$$

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

"i is", 3,
" --
----------"

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

$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \rightarrow \frac{\left(\frac{1}{y\sim}\right)^{-a\sim} e^{-\frac{y\sim}{b\sim}} b\sim^{-a\sim}}{y\sim \Gamma(a\sim)}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
"l and u", 0, ∞

$$\text{"g(x)"}, \frac{1}{x}, \text{"base"}, \frac{x^{-a\sim-1} e^{-\frac{1}{x\,b\sim}}}{\Gamma(a\sim)\, b\sim^{a\sim}}, \text{"InvertedGammaRV(a,b)"}$$
$$\text{"f(x)"}, \frac{\left(\frac{1}{x}\right)^{-a\sim} e^{-\frac{x}{b\sim}} b\sim^{-a\sim}}{x\, \Gamma(a\sim)}$$
"i is", 4,
" ---"

$$g := t \rightarrow \arctan(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \rightarrow \frac{\tan(y\sim)^{-a\sim-1} e^{-\frac{1}{\tan(y\sim)\, b\sim}} b\sim^{-a\sim} \left(1+\tan(y\sim)^2\right)}{\Gamma(a\sim)}\right], \left[0, \frac{1}{2}\pi\right], [\text{"Continuous"}, \text{"PDF"}]\right]$$
"l and u", 0, ∞

$$\text{"g(x)"}, \arctan(x), \text{"base"}, \frac{x^{-a\sim-1} e^{-\frac{1}{x\,b\sim}}}{\Gamma(a\sim)\, b\sim^{a\sim}}, \text{"InvertedGammaRV(a,b)"}$$
$$\text{"f(x)"}, \frac{\tan(x)^{-a\sim-1} e^{-\frac{1}{\tan(x)\, b\sim}} b\sim^{-a\sim} \left(1+\tan(x)^2\right)}{\Gamma(a\sim)}$$
"i is", 5,
" ---"

$$g := t \rightarrow e^{t}$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \rightarrow \frac{\ln(y\sim)^{-a\sim-1} e^{-\frac{1}{\ln(y\sim)\, b\sim}} b\sim^{-a\sim}}{\Gamma(a\sim)\, y\sim}\right], [1, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
"l and u", 0, ∞

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

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

"i is", 6,

"--"

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"},\ \ln(x),\ \text{"base"},\ \frac{x^{-a\sim-1}\,e^{-\frac{1}{x\,b\sim}}}{\Gamma(a\sim)\,b\sim^{a\sim}},\ \text{"InvertedGammaRV(a,b)"}$$

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

"i is", 7,

"--"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

"i is", 8,

"--"

$$g := t \to -\ln(t)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y{\sim} \to \frac{e^{-\frac{-y{\sim}\, b{\sim}\, a{\sim} + e^{y{\sim}}}{b{\sim}}}\, b{\sim}^{-a{\sim}}}{\Gamma(a{\sim})}\right], [-\infty, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, -\ln(x), \text{"base"}, \frac{x^{-a{\sim}-1}\, e^{-\frac{1}{x\, b{\sim}}}}{\Gamma(a{\sim})\, b{\sim}^{a{\sim}}}, \text{"InvertedGammaRV(a,b)"}$$
$$\text{"f(x)"}, \frac{e^{-\frac{-x\, b{\sim}\, a{\sim} + e^{x}}{b{\sim}}}\, b{\sim}^{-a{\sim}}}{\Gamma(a{\sim})}$$
"i is", 9,
" --
----------"

$$g := t \to \ln(t+1)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y{\sim} \to \frac{\left(e^{y{\sim}} - 1\right)^{-a{\sim}-1}\, e^{\frac{y{\sim}\, b{\sim}\, e^{y{\sim}} - y{\sim}\, b{\sim} - 1}{\left(e^{y{\sim}} - 1\right) b{\sim}}}\, b{\sim}^{-a{\sim}}}{\Gamma(a{\sim})}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, \ln(x+1), \text{"base"}, \frac{x^{-a{\sim}-1}\, e^{-\frac{1}{x\, b{\sim}}}}{\Gamma(a{\sim})\, b{\sim}^{a{\sim}}}, \text{"InvertedGammaRV(a,b)"}$$
$$\text{"f(x)"}, \frac{\left(e^{x} - 1\right)^{-a{\sim}-1}\, e^{\frac{x\, b{\sim}\, e^{x} - x\, b{\sim} - 1}{\left(e^{x} - 1\right) b{\sim}}}\, b{\sim}^{-a{\sim}}}{\Gamma(a{\sim})}$$
"i is", 10,
" --
----------"

$$g := t \to \frac{1}{\ln(t+2)}$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y{\sim} \to \frac{\left(e^{\frac{1}{y{\sim}}} - 2\right)^{-a{\sim}-1}\, e^{\frac{b{\sim}\, e^{\frac{1}{y{\sim}}} - 2\, b{\sim} - y{\sim}}{\left(e^{\frac{1}{y{\sim}}} - 2\right) b{\sim}\, y{\sim}}}\, b{\sim}^{-a{\sim}}}{\Gamma(a{\sim})\, y{\sim}^{2}}\right], \left[0, \frac{1}{\ln(2)}\right], [\text{"Continuous"},\right.$$

"PDF"]

"l and u", 0, ∞

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

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

"i is", 11,
" ---
----------"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

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

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

"i is", 13,

" --"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

"i is", 14,

" --"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

"i is", 15,
" ---"

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

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

"l and u", 0, ∞

$$\text{"g(x)"}, \operatorname{arccsch}(x+1), \text{"base"}, \frac{x^{-a\sim -1} \mathrm{e}^{-\frac{1}{x\, b\sim}}}{\Gamma(a\sim)\, b\sim^{a\sim}}, \text{"InvertedGammaRV(a,b)"}$$

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

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

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

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

"l and u", 0, ∞

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

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

"i is", 17,
" --"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

"i is", 18,
" --"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

"i is", 19,
" ---
----------"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

"i is", 20,
" --
----------"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

"i is", 21,
" --
----------"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

"i is", 22,
" --
----------"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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