```
> 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 := LogLogisticRV(1, 2);
  bfname := "LogLogisticRV(1, 2)";
```

$$bf := \left[\left[x \to \frac{2\,x}{\left(x^2+1\right)^2}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

$$bfname := \text{"LogLogisticRV(1, 2)"} \quad \textbf{(1)}$$

```
> #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:/Latex_Output_2/LogLogistic.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));
  print("F(x)", CDF(Temp, x));
  if i=14 then print("IDF did not work") elif i=19 then print
("IDF did not work") elif i=21 then print("IDF did not work")
else print("IDF(x)", IDF(Temp)) end if;
  print("S(x)", SF(Temp, x));
  print("h(x)", HF(Temp, x));
  if i=18 then print("No Mean/Variance") else print("mean and
variance", Mean(Temp), Variance(Temp)) end if;
  assume(r > 0); mf := int(x^r*PDF(Temp, x), x = Temp[2][1] ..
Temp[2][2]):
  print("MF", mf);
  print("MGF", MGF(Temp));
  #PlotDist(PDF(Temp), 0, 40);
  #PlotDist(HF(Temp), 0, 40);
  latex(PDF(Temp,x));
  #print("transforming with", [[x->g(x)],[0,infinity]]);
  #X2 := Transform(bf, [[x->g(x)],[0,infinity]]);
  #print("pdf of X2 = ", PDF(X2,x));
  #print("pdf of Temp = ", PDF(Temp,x));


  #latex output
  appendto(filename);
  printf("-----------------------------------------------------------
------------------------------------  \\\\");
  printf("$$");
  latex(glist[i]);
  printf("$$");
  printf("Probability Distribution Function \n$$  f(x)=");
  latex(PDF(Temp,x));
  printf("$$");
  printf("Cumulative Distribution Function  \n $$F(x)=");
  latex(CDF(Temp,x));
  printf("$$");
  printf(" Inverse Cumulative Distribution Function \n ");
```

```
  printf(" $$F^{-1} = ");
  if i=14 then print("Unable to find IDF") elif i=19 then print
("Unable to find IDF") elif i=21 then print("Unable to find IDF")
else latex(IDF(Temp)[1]) end if;
  printf("$$");
  printf("Survivor Function \n $$ S(x)=");
  latex(SF(Temp, x));
  printf("$$ Hazard Function \n $$ h(x)=");
  latex(HF(Temp,x));
  printf("$$");
  printf("Mean \n $$ \mu=");
  latex(Mean(Temp));
  printf("$$ Variance \n $$ \sigma^2 = ");
  latex(Variance(Temp));
  printf("$$");
  printf("Moment Function \n $$ m(x) = ");
  latex(mf);
  printf("$$ Moment Generating Function \n $$");
  latex(MGF(Temp)[1]);
  printf("$$");
  #latex(MGF(Temp)[1]);

  writeto(terminal);


od;

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

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

$$\frac{2\,x}{\left(x^2+1\right)^2}$$

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{1}{(y\sim+1)^2}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, x^2, \text{"base"}, \frac{2\,x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{1}{(x+1)^2}$$

$$"F(x)",\ \frac{x}{x+1}$$

$$"IDF(x)",\ \left[\left[s \to -\frac{s}{s-1}\right], [0, 1], ["Continuous", "IDF"]\right]$$

$$"S(x)",\ \frac{1}{x+1}$$

$$"h(x)",\ \frac{1}{x+1}$$

$$"mean\ and\ variance",\ \infty,\ \mathit{undefined}$$

$$mf := \pi \csc(\pi r\sim)\ r\sim$$

$$"MF",\ \pi \csc(\pi r\sim)\ r\sim$$

$$"MGF",\ \lim_{x\to\infty} \Big(-\frac{1}{x+1} \big(\mathrm{Ei}(1, -t x - t)\ t x\, \mathrm{e}^{-t} - \mathrm{Ei}(1, -t)\ t x\, \mathrm{e}^{-t} + \mathrm{Ei}(1, -t x - t)\ t\, \mathrm{e}^{-t} - \mathrm{e}^{-t}\, \mathrm{Ei}(1, -t)\ t + \mathrm{e}^{t x} - x - 1\big)\Big)$$

```
\left( x+1 \right) ^{-2}
```

"i is", 2,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{4\, y\sim^3}{(y\sim^4 + 1)^2}\right], [0, \infty], ["Continuous", "PDF"]\right]$$

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

$$"g(x)",\ \sqrt{x},\ "base",\ \frac{2\, x}{(x^2+1)^2},\ "LogLogisticRV(1, 2)"$$

$$"f(x)",\ \frac{4\, x^3}{(x^4+1)^2}$$

$$"F(x)",\ \frac{x^4}{x^4+1}$$

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

$$"IDF(x)",\ \left[\left[s \to -\frac{\sqrt{-(s-1)\sqrt{-(s-1)\, s}}}{s-1}\right], [0, 1], ["Continuous", "IDF"]\right]$$

$$"S(x)",\ \frac{1}{x^4+1}$$

$$\text{"h(x)"}, \frac{4\,x^3}{x^4+1}$$

$$\text{"mean and variance"}, \frac{1}{4}\,\pi\sqrt{2}, \frac{1}{2}\,\pi - \frac{1}{8}\,\pi^2$$

$$mf := \frac{1}{4}\,\pi \csc\left(\frac{1}{4}\,\pi\, r\sim\right) r\sim$$

$$\text{"MF"}, \frac{1}{4}\,\pi \csc\left(\frac{1}{4}\,\pi\, r\sim\right) r\sim$$

$$\text{"MGF"}, \lim_{x\to\infty} \Bigg(-\frac{1}{8}\,\frac{1}{x^4+1}\Bigg(-8 + \mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -t\,x - \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t$$

$$+ \mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -t\,x + \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t - \mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1, -t\,x$$

$$+ \frac{1}{2}\sqrt{2}\,t + \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^4 + \mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1, -t\,x - \frac{1}{2}\sqrt{2}\,t$$

$$+ \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^4 + \mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -t\,x - \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t\,x^4$$

$$- \mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -t\,x + \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t\,x^4 - \mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,$$

$$-\frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t + \mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t$$

$$+ \mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, \frac{1}{2}\sqrt{2}\,t + \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t - \mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1, -\frac{1}{2}\sqrt{2}\,t$$

$$+ \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t - \mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -t\,x + \frac{1}{2}\sqrt{2}\,t + \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t$$

$$+ \mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -t\,x - \frac{1}{2}\sqrt{2}\,t + \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t + \mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1, -t\,x$$

$$- \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t - \mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1, -t\,x + \frac{1}{2}\sqrt{2}\,t$$

$$- \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t - \mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t$$

$$+ \mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, \frac{1}{2}\sqrt{2}\,t + \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t + \mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,$$

$$-\frac{1}{2}\sqrt{2}\,t + \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t - \mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, -\frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t$$

$$+ \mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\left(1, \frac{1}{2}\sqrt{2}\,t - \frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\right)\sqrt{2}\,t\,x^4 + \mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1, \frac{1}{2}\sqrt{2}\,t$$

$$+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}-\mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-\frac{1}{2}\sqrt{2}\,t+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}$$

$$-\mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-\frac{1}{2}\sqrt{2}\,t-\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}-\mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-t\,x$$

$$+\frac{1}{2}\sqrt{2}\,t+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t-\mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-t\,x-\frac{1}{2}\sqrt{2}\,t$$

$$+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t+8\,\mathrm{e}^{t\,x}-8\,x^{4}-\mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,\frac{1}{2}\sqrt{2}\,t-\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}$$

$$-\mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-\frac{1}{2}\sqrt{2}\,t-\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}+\mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,$$

$$\frac{1}{2}\sqrt{2}\,t+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}+\mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-\frac{1}{2}\sqrt{2}\,t+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}$$

$$-\mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-t\,x+\frac{1}{2}\sqrt{2}\,t+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}-\mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}+\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,$$

$$-t\,x-\frac{1}{2}\sqrt{2}\,t+\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}+\mathrm{I}\,\mathrm{e}^{\left(-\frac{1}{2}-\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-t\,x-\frac{1}{2}\sqrt{2}\,t$$

$$-\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}+\mathrm{I}\,\mathrm{e}^{\left(\frac{1}{2}-\frac{1}{2}\,\mathrm{I}\right)\sqrt{2}\,t}\,\mathrm{Ei}\Big(1,-t\,x+\frac{1}{2}\sqrt{2}\,t-\frac{1}{2}\,\mathrm{I}\,t\sqrt{2}\Big)\sqrt{2}\,t\,x^{4}\Big)\Big)$$

```
4\,{\frac {{x}^{3}}{ \left( {x}^{4}+1 \right) ^{2}}}
```

"i is", 3,

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

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

$$\text{"g(x)"}, \frac{1}{x}, \text{"base"}, \frac{2\,x}{\left(x^{2}+1\right)^{2}}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{2\,x}{\left(x^{2}+1\right)^{2}}$$

$$\text{"F(x)"}, \frac{x^{2}}{x^{2}+1}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \to -\frac{\sqrt{-(s-1)\,s}}{s-1}\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{1}{x^2+1}$$

$$\text{"h(x)"}, \frac{2\,x}{x^2+1}$$

$$\text{"mean and variance"}, \frac{1}{2}\,\pi, \infty$$

$$mf := \frac{1}{2}\,\pi \csc\left(\frac{1}{2}\,\pi\, r\sim\right) r\sim$$

$$\text{"MF"}, \frac{1}{2}\,\pi \csc\left(\frac{1}{2}\,\pi\, r\sim\right) r\sim$$

$$\text{"MGF"}, \lim_{x\to\infty} \frac{1}{2}\,\frac{1}{x^2+1}\left(-e^{It}\,\mathrm{csgn}(t)\,\pi\, t\, x^2 + 2\, e^{It}\,\mathrm{Si}(t)\, t\, x^2 + I\, e^{It}\,\mathrm{Ei}(1, -t\,x + I\,t)\, t\, x^2 - e^{It}\,\mathrm{csgn}(t)\,\pi\, t - I\, e^{It}\,\mathrm{Ei}(1, -I\,t)\, t\, x^2 - I\, e^{-It}\,\mathrm{Ei}(1, -t\,x - I\,t)\, t\, x^2 + 2\, e^{It}\,\mathrm{Si}(t)\, t + I\, e^{-It}\,\mathrm{Ei}(1, -I\,t)\, t\, x^2 + I\, e^{It}\,\mathrm{Ei}(1, -t\,x + I\,t)\, t - I\, e^{It}\,\mathrm{Ei}(1, -I\,t)\, t - I\, e^{-It}\,\mathrm{Ei}(1, -t\,x - I\,t)\, t + I\, t\, e^{-It}\,\mathrm{Ei}(1, -I\,t) + 2\, x^2 - 2\, e^{t\,x} + 2\right)$$

```
2\,{\frac {x}{ \left( {x}^{2}+1 \right) ^{2}}}
```

"i is", 4,

" ---"

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[[y\sim \to 2\sin(y\sim)\cos(y\sim)], \left[0, \frac{1}{2}\,\pi\right], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \arctan(x), \text{"base"}, \frac{2\,x}{(x^2+1)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, 2\sin(x)\cos(x)$$

$$\text{"F(x)"}, \sin(x)^2$$

$$\text{"IDF(x)"}, [[s \to \arcsin(\sqrt{s})], [0, 1], [\text{"Continuous"}, \text{"IDF"}]]$$

$$\text{"S(x)"}, \cos(x)^2$$

$$\text{"h(x)"}, \frac{2\sin(x)}{\cos(x)}$$

$$\text{"mean and variance"}, \frac{1}{4}\,\pi, \frac{1}{16}\,\pi^2 - \frac{1}{2}$$

$$mf := \frac{3\,2^{-2-r\sim}\sqrt{\pi}\left(\frac{4}{3} + \frac{2}{3}\,r\sim\right)\mathrm{LommelS1}\left(r\sim + \frac{1}{2}, \frac{1}{2}, \pi\right)}{2 + r\sim}$$

$$"MF", \frac{3\, 2^{-2-r\sim} \sqrt{\pi} \left(\frac{4}{3} + \frac{2}{3} r\sim\right) \mathrm{LommelS1}\left(r\sim + \frac{1}{2}, \frac{1}{2}, \pi\right)}{2 + r\sim}$$

$$"MGF", \frac{2\left(1 + e^{\frac{1}{2}\pi t}\right)}{t^2 + 4}$$

```
2\,\sin \left( x \right) \cos \left( x \right)
```

"i is", 5,

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

$$g := t \rightarrow e^t$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{2 \ln(y\sim)}{\left(\ln(y\sim)^2 + 1\right)^2 y\sim}\right], [1, \infty], ["Continuous", "PDF"]\right]$$

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

$$"g(x)", e^x, "base", \frac{2x}{\left(x^2 + 1\right)^2}, "LogLogisticRV(1, 2)"$$

$$"f(x)", \frac{2 \ln(x)}{\left(\ln(x)^2 + 1\right)^2 x}$$

$$"F(x)", \frac{\ln(x)^2}{\ln(x)^2 + 1}$$

ERROR(IDF): Could not find the appropriate inverse

$$"IDF(x)", \left[\left[s \rightarrow e^{-\frac{\sqrt{-(s-1)s}}{s-1}}\right], [0, 1], ["Continuous", "IDF"]\right]$$

$$"S(x)", \frac{1}{\ln(x)^2 + 1}$$

$$"h(x)", \frac{2 \ln(x)}{\left(\ln(x)^2 + 1\right) x}$$

$$"mean and variance", \infty, \mathit{undefined}$$

$$mf := \infty$$

$$"MF", \infty$$

$$"MGF", \int_1^{\infty} \frac{2 e^{tx} \ln(x)}{\left(\ln(x)^2 + 1\right)^2 x} \, dx$$

```
2\,{\frac {\ln  \left( x \right) }{ \left(  \left( \ln  \left( x
 \right)  \right) ^{2}+1 \right) ^{2}x}}
```

"i is", 6,

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

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

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

"g(x)", $\ln(x)$, "base", $\frac{2\,x}{\left(x^2+1\right)^2}$, "LogLogisticRV(1, 2)"

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

"F(x)", $\frac{e^{2 x}}{e^{2 x}+1}$

"IDF(x)", $\left[\left[s \to \frac{1}{2} \ln\left(-\frac{s}{s-1}\right)\right], [0, 1], ["Continuous", "IDF"]\right]$

"S(x)", $\frac{1}{e^{2 x}+1}$

"h(x)", $\frac{2\, e^{2 x}}{e^{2 x}+1}$

"mean and variance", 0, $\frac{1}{12}\pi^2$

$$mf := \int_{-\infty}^{\infty} \frac{2\, x^{r\sim}\, e^{2 x}}{\left(e^{2 x}+1\right)^2}\, dx$$

"MF", $\int_{-\infty}^{\infty} \frac{2\, x^{r\sim}\, e^{2 x}}{\left(e^{2 x}+1\right)^2}\, dx$

"MGF", $\int_{-\infty}^{\infty} \frac{2\, e^{x (t+2)}}{\left(e^{2 x}+1\right)^2}\, dx$

```
2\,{\frac {{{\rm e}^{2\,x}}}{ \left( {{\rm e}^{2\,x}}+1 \right)
^{2}}}
```
"i is", 7,
" --
----------"

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

$$\text{"g(x)"}, e^{-x}, \text{"base"}, \frac{2x}{(x^2+1)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, -\frac{2\ln(x)}{(\ln(x)^2+1)^2 x}$$

$$\text{"F(x)"}, \frac{1}{\ln(x)^2+1}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \to e^{-\frac{\sqrt{-s(s-1)}}{s}}\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, 1-\frac{1}{\ln(x)^2+1}$$

$$\text{"h(x)"}, -\frac{2}{\ln(x)\left(\ln(x)^2+1\right)x}$$

$$\text{"mean and variance"}, -\frac{1}{2}\, \mathrm{I}\, e^{\mathrm{I}}\, \mathrm{Ei}(1, \mathrm{I}) + \frac{1}{2}\, \mathrm{I}\, e^{-\mathrm{I}}\, \mathrm{Ei}(1, -\mathrm{I}) + 1, -\mathrm{I}\, \mathrm{Ei}(1, 2\,\mathrm{I})\, e^{2\,\mathrm{I}} + \mathrm{I}\, \mathrm{Ei}(1, -2\,\mathrm{I})\, e^{-2\,\mathrm{I}} + \frac{1}{4}\, e^{2\,\mathrm{I}}\, \mathrm{Ei}(1, \mathrm{I})^2 - \frac{1}{2}\, \mathrm{Ei}(1, \mathrm{I})\, \mathrm{Ei}(1, -\mathrm{I}) + \mathrm{I}\, e^{\mathrm{I}}\, \mathrm{Ei}(1, \mathrm{I}) + \frac{1}{4}\, e^{-2\,\mathrm{I}}\, \mathrm{Ei}(1, -\mathrm{I})^2 - \mathrm{I}\, e^{-\mathrm{I}}\, \mathrm{Ei}(1, -\mathrm{I})$$

$$mf := -\frac{1}{2}\left(\mathrm{I}\, r\sim e^{2\,\mathrm{I}\, r\sim}\, \mathrm{Ei}(1, \mathrm{I}\, r\sim) - \mathrm{I}\, r\sim \mathrm{Ei}(1, -\mathrm{I}\, r\sim) - 2\, e^{\mathrm{I}\, r\sim}\right) e^{-\mathrm{I}\, r\sim}$$

$$\text{"MF"}, -\frac{1}{2}\left(\mathrm{I}\, r\sim e^{2\,\mathrm{I}\, r\sim}\, \mathrm{Ei}(1, \mathrm{I}\, r\sim) - \mathrm{I}\, r\sim \mathrm{Ei}(1, -\mathrm{I}\, r\sim) - 2\, e^{\mathrm{I}\, r\sim}\right) e^{-\mathrm{I}\, r\sim}$$

$$\text{"MGF"}, -2\left(\int_0^1 \frac{e^{t x}\ln(x)}{\left(\ln(x)^2+1\right)^2 x}\, dx\right)$$

```
-2\,{\frac {\ln  \left( x \right) }{ \left(  \left( \ln  \left(
x
 \right)  \right) ^{2}+1 \right) ^{2}x}}
```

"i is", 8,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, -\ln(x), \text{"base"}, \frac{2x}{(x^2+1)^2}, \text{"LogLogisticRV(1, 2)"}$$

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

$$"F(x)", \frac{e^{2x}}{e^{2x}+1}$$

$$"IDF(x)", \left[\left[s \rightarrow \frac{1}{2}\ln\left(-\frac{s}{s-1}\right)\right], [0, 1], ["Continuous", "IDF"]\right]$$

$$"S(x)", \frac{1}{e^{2x}+1}$$

$$"h(x)", \frac{2\,e^{2x}}{e^{2x}+1}$$

$$"mean and variance", 0, \frac{1}{12}\pi^2$$

$$mf := \int_{-\infty}^{\infty} \frac{2\,x^{r\sim}\,e^{2x}}{\left(e^{2x}+1\right)^2}\,dx$$

$$"MF", \int_{-\infty}^{\infty} \frac{2\,x^{r\sim}\,e^{2x}}{\left(e^{2x}+1\right)^2}\,dx$$

$$"MGF", \int_{-\infty}^{\infty} \frac{2\,e^{x(t+2)}}{\left(e^{2x}+1\right)^2}\,dx$$

```
2\,{\frac {{{\rm e}^{2\,x}}}{ \left( {{\rm e}^{2\,x}}+1 \right)
^{2}}}
```

"i is", 9,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$"g(x)", \ln(x+1), "base", \frac{2\,x}{\left(x^2+1\right)^2}, "LogLogisticRV(1, 2)"$$

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

$$"F(x)", \frac{e^{2x}-2\,e^{x}+1}{e^{2x}-2\,e^{x}+2}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \to \ln\left(-\frac{-s+1+\sqrt{-s\,(s-1)}}{s-1}\right)\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{1}{e^{2x}-2\,e^{x}+2}$$

$$\text{"h(x)"}, \frac{2\,(e^{x}-1)\,e^{x}}{e^{2x}-2\,e^{x}+2}$$

$$\text{"mean and variance"}, \frac{1}{4}\,\pi, \left(\frac{1}{2}-\frac{1}{2}\,I\right)\operatorname{dilog}\left(\frac{1}{2}-\frac{1}{2}\,I\right)+\left(\frac{1}{2}+\frac{1}{2}\,I\right)\operatorname{dilog}\left(\frac{1}{2}+\frac{1}{2}\,I\right)$$
$$+\frac{1}{2}\,I\ln(2)\ln(-1-I)+\frac{1}{4}\,I\ln(-1+I)^{2}-\frac{1}{2}\,I\ln(2)\ln(-1+I)+\frac{5}{48}\,\pi^{2}$$
$$+\frac{1}{2}\ln(2)^{2}-\frac{1}{2}\ln(2)\ln(-1+I)-\frac{1}{2}\ln(2)\ln(-1-I)+\frac{1}{4}\ln(-1+I)^{2}$$
$$+\frac{1}{4}\ln(-1-I)^{2}-\frac{1}{4}\,I\ln(-1-I)^{2}$$

$$mf := \int_{0}^{\infty}\frac{2\,x^{r\sim}\,(e^{x}-1)\,e^{x}}{(-e^{2x}+2\,e^{x}-2)^{2}}\,dx$$

$$\text{"MF"}, \int_{0}^{\infty}\frac{2\,x^{r\sim}\,(e^{x}-1)\,e^{x}}{(-e^{2x}+2\,e^{x}-2)^{2}}\,dx$$

$$\text{"MGF"}, \int_{0}^{\infty}\frac{2\,(e^{x}-1)\,e^{x\,(t+1)}}{(e^{2x}-2\,e^{x}+2)^{2}}\,dx$$

```
2\,{\frac { \left( {{\rm e}^{x}}-1 \right) {{\rm e}^{x}}}{ \left
( -{
{\rm e}^{2\,x}}+2\,{{\rm e}^{x}}-2 \right) ^{2}}}
```

"i is", 10,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{2\left(e^{\frac{1}{y\sim}}-2\right)e^{\frac{1}{y\sim}}}{\left(e^{\frac{2}{y\sim}}-4\,e^{\frac{1}{y\sim}}+5\right)^{2}y\sim^{2}}\right], \left[0, \frac{1}{\ln(2)}\right], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \frac{1}{\ln(x+2)}, \text{"base"}, \frac{2\,x}{(x^{2}+1)^{2}}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{2\left(e^{\frac{1}{x}}-2\right)e^{\frac{1}{x}}}{\left(e^{\frac{2}{x}}-4e^{\frac{1}{x}}+5\right)^2 x^2}$$

$$\text{"F(x)"}, \frac{1}{e^{\frac{2}{x}}-4e^{\frac{1}{x}}+5}$$

$$\text{"IDF(x)"}, \left[\left[s \to \frac{1}{\ln\left(\frac{2s+\sqrt{-s(s-1)}}{s}\right)}\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{-e^{\frac{2}{x}}+4e^{\frac{1}{x}}-4}{-e^{\frac{2}{x}}+4e^{\frac{1}{x}}-5}$$

$$\text{"h(x)"}, \frac{2e^{\frac{1}{x}}}{\left(e^{\frac{2}{x}}-4e^{\frac{1}{x}}+5\right)\left(e^{\frac{1}{x}}-2\right)x^2}$$

$$\text{"mean and variance"}, 2\left(\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}}-2\right)e^{\frac{1}{x}}}{x\left(-e^{\frac{2}{x}}+4e^{\frac{1}{x}}-5\right)^2}\,dx\right), 2\left(\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}}-2\right)e^{\frac{1}{x}}}{\left(-e^{\frac{2}{x}}+4e^{\frac{1}{x}}-5\right)^2}\,dx\right) - 4\left(\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}}-2\right)e^{\frac{1}{x}}}{x\left(-e^{\frac{2}{x}}+4e^{\frac{1}{x}}-5\right)^2}\,dx\right)^2$$

$$mf := \int_0^{\frac{1}{\ln(2)}} \frac{2x^{r\sim}\left(e^{\frac{1}{x}}-2\right)e^{\frac{1}{x}}}{\left(e^{\frac{2}{x}}-4e^{\frac{1}{x}}+5\right)^2 x^2}\,dx$$

$$\text{"MF"}, \int_0^{\frac{1}{\ln(2)}} \frac{2x^{r\sim}\left(e^{\frac{1}{x}}-2\right)e^{\frac{1}{x}}}{\left(e^{\frac{2}{x}}-4e^{\frac{1}{x}}+5\right)^2 x^2}\,dx$$

$$\text{"MGF"}, 2\left(\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}}-2\right) e^{\frac{t x^2+1}{x}}}{\left(-e^{\frac{2}{x}}+4 e^{\frac{1}{x}}-5\right)^2 x^2}\, dx\right)$$

```
2\,{\frac { \left( {{\rm e}^{{x}^{-1}}}-2 \right) {{\rm e}^{{x}^
{-1}}}
}{{x}^{2}} \left( {{\rm e}^{2\,{x}^{-1}}}-4\,{{\rm e}^{{x}^{-1}}
}+5
 \right) ^{-2}}
```

"i is", 11,

" --"

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \tanh(x), \text{"base"}, \frac{2x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

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

$$\text{"F(x)"}, \frac{\operatorname{arctanh}(x)^2}{\operatorname{arctanh}(x)^2+1}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \to -\tanh\left(\frac{\sqrt{-s\,(s-1)}}{s-1}\right)\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{1}{\operatorname{arctanh}(x)^2+1}$$

$$\text{"h(x)"}, -\frac{2 \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right) \left(x^2-1\right)}$$

$$\text{"mean and variance"}, -2\left(\int_0^1 \frac{x \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)^2 \left(x^2-1\right)}\, dx\right), -2\left(\int_0^1 \frac{x^2 \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)^2 \left(x^2-1\right)}\, dx\right) - 4\left(\int_0^1 \frac{x \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)^2 \left(x^2-1\right)}\, dx\right)^2$$

$$mf := \int_0^1 \left(- \frac{2\, x^{r\sim} \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)^2 (x^2-1)} \right) dx$$

$$\text{"MF"}, \int_0^1 \left(- \frac{2\, x^{r\sim} \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)^2 (x^2-1)} \right) dx$$

$$\text{"MGF"}, -2 \left(\int_0^1 \frac{e^{t x} \operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)^2 (x^2-1)} dx \right)$$

```
-2\,{\frac {{\rm arctanh} \left(x\right)}{ \left(  \left(
{\rm arctanh} \left(x\right) \right) ^{2}+1 \right) ^{2} \left(
{x}^{2
}-1 \right) }}
```

"i is", 12,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \sinh(x), \text{"base"}, \frac{2\,x}{(x^2+1)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{2 \operatorname{arcsinh}(x)}{\left(\operatorname{arcsinh}(x)^2+1\right)^2 \sqrt{x^2+1}}$$

$$\text{"F(x)"}, \frac{\ln\left(-x+\sqrt{x^2+1}\right)^2}{\ln\left(-x+\sqrt{x^2+1}\right)^2+1}$$

$$\text{"IDF(x)"}, \left[\left[s \to -\frac{1}{2} e^{\frac{\sqrt{-s(s-1)}}{s-1}} + \frac{1}{2} e^{-\frac{\sqrt{-s(s-1)}}{s-1}} \right], [0, 1], [\text{"Continuous"}, \text{"IDF"}] \right]$$

$$\text{"S(x)"}, \frac{1}{\ln\left(-x+\sqrt{x^2+1}\right)^2+1}$$

$$\text{"h(x)"}, \frac{2 \operatorname{arcsinh}(x) \left(\ln\left(-x+\sqrt{x^2+1}\right)^2+1\right)}{\left(\operatorname{arcsinh}(x)^2+1\right)^2 \sqrt{x^2+1}}$$

$$\text{"mean and variance"}, \infty, \mathit{undefined}$$

$$mf := \infty$$

$$\text{"MF"}, \infty$$

$$\text{"MGF"}, \int_0^{\infty} \frac{2\, e^{t x} \operatorname{arcsinh}(x)}{\left(\operatorname{arcsinh}(x)^2+1\right)^2 \sqrt{x^2+1}} \, dx$$

```
2\,{\frac {{\rm arcsinh} \left(x\right)}{ \left(  \left( {\rm
arcsinh}
 \left(x\right) \right) ^{2}+1 \right) ^{2}\sqrt {{x}^{2}+1}}}
```

"i is", 13,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{2 \sinh(y\sim)}{\cosh(y\sim)^3}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \operatorname{arcsinh}(x), \text{"base"}, \frac{2 x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{2 \sinh(x)}{\cosh(x)^3}$$

$$\text{"F(x)"}, \frac{e^{4 x}-2 e^{2 x}+1}{e^{4 x}+2 e^{2 x}+1}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \rightarrow \frac{1}{2} \ln\left(-\frac{s+1+2\sqrt{s}}{s-1}\right)\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{4 e^{2 x}}{e^{4 x}+2 e^{2 x}+1}$$

$$\text{"h(x)"}, \frac{1}{2} \frac{\sinh(x)\left(e^{2 x}+2+e^{-2 x}\right)}{\cosh(x)^3}$$

$$\text{"mean and variance"}, 1, 2 \ln(2)-1$$

$$mf := \int_0^{\infty} \frac{2\, x^{r\sim} \sinh(x)}{\cosh(x)^3} \, dx$$

$$\text{"MF"}, \int_0^{\infty} \frac{2\, x^{r\sim} \sinh(x)}{\cosh(x)^3} \, dx$$

$$\text{"MGF"}, \int_0^{\infty} \frac{2\, e^{t x} \sinh(x)}{\cosh(x)^3} \, dx$$

```
2\,{\frac {\sinh \left( x \right) }{ \left( \cosh \left( x
\right)
 \right) ^{3}}}
```

"i is", 14,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \operatorname{csch}(x+1), \text{"base"}, \frac{2\,x}{(x^2+1)^2}, \text{"LogLogisticRV(1, 2)"}$$

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

$$\text{"F(x)"}, 2\left(\int_0^x \frac{-1+\operatorname{arccsch}(t)}{\sqrt{t^2+1}\,\left(\operatorname{arccsch}(t)^2-2\operatorname{arccsch}(t)+2\right)^2 |t|}\,\mathrm{d}t\right)$$

$$\text{"IDF did not work"}$$

$$\text{"S(x)"}, 1-2\left(\int_0^x \frac{-1+\operatorname{arccsch}(t)}{\sqrt{t^2+1}\,\left(\operatorname{arccsch}(t)^2-2\operatorname{arccsch}(t)+2\right)^2 |t|}\,\mathrm{d}t\right)$$

$$\text{"h(x)"}, -(2\,(-1+\operatorname{arccsch}(x)))\Bigg/\left(\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2-2\operatorname{arccsch}(x)+2\right)^2 |x| \left(-1\right.\right.$$
$$\left.\left. +2\left(\int_0^x \frac{-1+\operatorname{arccsch}(t)}{\sqrt{t^2+1}\,\left(\operatorname{arccsch}(t)^2-2\operatorname{arccsch}(t)+2\right)^2 |t|}\,\mathrm{d}t\right)\right)\right)$$

$$\text{"mean and variance"}, 2\left(\int_0^{\frac{2\,\mathrm{e}}{\mathrm{e}^2-1}} \frac{-1+\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2-2\operatorname{arccsch}(x)+2\right)^2}\,\mathrm{d}x\right), 2\left(\right.$$
$$\left.\int_0^{\frac{2\,\mathrm{e}}{\mathrm{e}^2-1}} \frac{x\,(-1+\operatorname{arccsch}(x))}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2-2\operatorname{arccsch}(x)+2\right)^2}\,\mathrm{d}x\right)$$
$$-4\left(\int_0^{\frac{2\,\mathrm{e}}{\mathrm{e}^2-1}} \frac{-1+\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2-2\operatorname{arccsch}(x)+2\right)^2}\,\mathrm{d}x\right)^2$$

$$mf := \int_0^{\frac{2}{e - e^{-1}}} \frac{2\, x^{r\sim} (-1 + \operatorname{arccsch}(x))}{\sqrt{x^2+1}\, \left(\operatorname{arccsch}(x)^2 - 2\operatorname{arccsch}(x) + 2\right)^2 |x|}\, dx$$

$$\text{"MF"}, \int_0^{\frac{2}{e - e^{-1}}} \frac{2\, x^{r\sim} (-1 + \operatorname{arccsch}(x))}{\sqrt{x^2+1}\, \left(\operatorname{arccsch}(x)^2 - 2\operatorname{arccsch}(x) + 2\right)^2 |x|}\, dx$$

$$\text{"MGF"}, 2 \left(\int_0^{\frac{2e}{e^2-1}} \frac{e^{t x} (-1 + \operatorname{arccsch}(x))}{\sqrt{x^2+1}\, \left(\operatorname{arccsch}(x)^2 - 2\operatorname{arccsch}(x) + 2\right)^2 x}\, dx \right)$$

```
2\,{\frac {-1+{\rm arccsch} \left(x\right)}{\sqrt {{x}^{2}+1}
\left(
 \left( {\rm arccsch} \left(x\right) \right) ^{2}-2\,{\rm
arccsch}
\left(x\right)+2 \right) ^{2} \left| x \right| }}
```

"i is", 15,

" ---"

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{2\, (\sinh(y\sim) - 1) \cosh(y\sim) \sinh(y\sim)}{-4 \cosh(y\sim)^4 + 8 \sinh(y\sim) \cosh(y\sim)^2 - 4 \sinh(y\sim) + 3} \right], \left[0, \ln\left(1 + \sqrt{2}\right)\right], [\text{"Continuous"}, \text{"PDF"}] \right]$$

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

$$\text{"g(x)"}, \operatorname{arccsch}(x+1), \text{"base"}, \frac{2\, x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{2\, (\sinh(x) - 1) \cosh(x) \sinh(x)}{-4 \cosh(x)^4 + 8 \sinh(x) \cosh(x)^2 - 4 \sinh(x) + 3}$$

$$\text{"F(x)"}, -\frac{1}{2} \frac{\left(e^{-x} - 1\right)^2 \left(e^{-x} + 1\right)^2}{-e^{-4x} - 2\, e^{-3x} + 2\, e^{-x} - 1}$$

$$\text{"IDF(x)"}, \left[\left[s \to -\ln\left(RootOf\left((2\, s - 1)\, \_Z^4 + 4\, s\, \_Z^3 + 2\, \_Z^2 - 4\, s\, \_Z + 2\, s - 1 \right) \right) \right], [0, 1], [\text{"Continuous"}, \text{"IDF"}] \right]$$

$$\text{"S(x)"}, \frac{1}{2} \frac{e^{-4x} + 4\, e^{-3x} + 2\, e^{-2x} - 4\, e^{-x} + 1}{e^{-4x} + 2\, e^{-3x} - 2\, e^{-x} + 1}$$

$$\text{"h(x)"}, \left(4\, (\sinh(x) - 1) \cosh(x) \sinh(x) \left(e^{-4x} + 2\, e^{-3x} - 2\, e^{-x} + 1\right)\right) \Big/ \left(\left(-4 \cosh(x)^4 \right.\right.$$

$$+ 8 \sinh(x) \cosh(x)^2 - 4 \sinh(x) + 3) \left(e^{-4x} + 4 e^{-3x} + 2 e^{-2x} - 4 e^{-x} + 1\right))$$

"mean and variance",

$$\frac{1}{20} \arctan\left(\frac{1}{4} \frac{1}{\sqrt{5} - 3} \left(\sqrt{2} \left(\sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 2 \sqrt{\sqrt{5} + 2} \sqrt{2}\right.\right.\right.$$
$$\left.\left.\left. + 2 \sqrt{\sqrt{5} + 2} + 2 \sqrt{-4 + 2\sqrt{5}}\right)\right)\right) \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + \frac{1}{20} \ln\left(-14 \sqrt{2}\right.$$
$$- 9 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2} - 6 \sqrt{5} \sqrt{2} - 20 \sqrt{-4 + 2\sqrt{5}} \sqrt{2}$$
$$\left. + 13 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} + 9 \sqrt{5} + 29 \sqrt{-4 + 2\sqrt{5}} + 20\right) \sqrt{5} \sqrt{\sqrt{5} + 2} + \frac{1}{2} \ln(1$$
$$+ \sqrt{2}), \frac{1}{10} \sqrt{4 - 2 I} \ln(1$$
$$+ \sqrt{2}) \arctan\left(\frac{1}{2} \frac{1}{2 \sqrt{5} \sqrt{2} + 3 \sqrt{5} - 4 \sqrt{2} - 7} \left(\sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2}\right.\right.$$
$$+ 2 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} - 3 \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 2 \sqrt{\sqrt{5} + 2} \sqrt{2} - 4 \sqrt{-4 + 2\sqrt{5}}$$
$$\left.\left. + 4 \sqrt{\sqrt{5} + 2}\right)\right) + \frac{1}{10} \sqrt{4 + 2 I} \ln(1$$
$$+ \sqrt{2}) \arctan\left(\frac{1}{2} \frac{1}{2 \sqrt{5} \sqrt{2} + 3 \sqrt{5} - 4 \sqrt{2} - 7} \left(\sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2}\right.\right.$$
$$+ 2 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} - 3 \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 2 \sqrt{\sqrt{5} + 2} \sqrt{2} - 4 \sqrt{-4 + 2\sqrt{5}}$$
$$\left.\left. + 4 \sqrt{\sqrt{5} + 2}\right)\right) + \frac{1}{10} \arctan\left(\sqrt{5} \sqrt{-4 + 2\sqrt{5}} + \frac{3}{4} \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2}\right.$$
$$\left. + 2 \sqrt{-4 + 2\sqrt{5}} + \frac{7}{4} \sqrt{-4 + 2\sqrt{5}} \sqrt{2}\right)^2 - \frac{1}{10} \pi \ln(1 + \sqrt{2}) \sqrt{4 - 2 I}$$
$$- \frac{1}{10} \pi \ln(1 + \sqrt{2}) \sqrt{4 + 2 I} - \frac{1}{40} \ln\left(-14 \sqrt{2} - 9 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2}\right.$$
$$- 6 \sqrt{5} \sqrt{2} - 20 \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 13 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} + 9 \sqrt{5}$$
$$\left. + 29 \sqrt{-4 + 2\sqrt{5}} + 20\right)^2 + \frac{1}{4} \ln(1 + \sqrt{2})^2 - \frac{1}{10} \ln(1 + \sqrt{2}) \sqrt{4 - 2 I} \ln\Big($$
$$-5 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 4 \sqrt{5} \sqrt{2} - 8 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} - 13 \sqrt{-4 + 2\sqrt{5}} \sqrt{2}$$
$$\left. + 6 \sqrt{5} + 8 \sqrt{2} - 20 \sqrt{-4 + 2\sqrt{5}} + 14\right) - \frac{1}{10} \ln(1 + \sqrt{2}) \sqrt{4 + 2 I} \ln\Big($$
$$-5 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 4 \sqrt{5} \sqrt{2} - 8 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} - 13 \sqrt{-4 + 2\sqrt{5}} \sqrt{2}$$
$$\left. + 6 \sqrt{5} + 8 \sqrt{2} - 20 \sqrt{-4 + 2\sqrt{5}} + 14\right) + \frac{1}{10} \ln(1$$
$$+ \sqrt{2}) \sqrt{4 - 2 I} \ln\left(5 \sqrt{5} \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 4 \sqrt{5} \sqrt{2} + 8 \sqrt{5} \sqrt{-4 + 2\sqrt{5}}\right.$$
$$\left. + 13 \sqrt{-4 + 2\sqrt{5}} \sqrt{2} + 6 \sqrt{5} + 8 \sqrt{2} + 20 \sqrt{-4 + 2\sqrt{5}} + 14\right) + \frac{1}{10} \ln(1$$

$$+\sqrt{2}\,)\,\sqrt{4+2\,\mathrm{I}}\,\ln(5\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+4\sqrt{5}\,\sqrt{2}+8\sqrt{5}\,\sqrt{-4+2\sqrt{5}}$$
$$+13\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+6\sqrt{5}+8\sqrt{2}+20\sqrt{-4+2\sqrt{5}}+14)-\frac{1}{20}\,\ln(-14\sqrt{2}$$
$$-9\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}-6\sqrt{5}\,\sqrt{2}-20\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+13\sqrt{5}\,\sqrt{-4+2\sqrt{5}}+9\sqrt{5}+29\sqrt{-4+2\sqrt{5}}+20)\,\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}\,\ln(1$$
$$+\sqrt{2}\,)+\frac{1}{20}\,\arctan(\sqrt{5}\,\sqrt{-4+2\sqrt{5}}+\frac{3}{4}\,\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+2\sqrt{-4+2\sqrt{5}}+\frac{7}{4}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}\,)\,\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}\,\ln(1+\sqrt{2}\,)$$
$$-\frac{1}{8}\,\ln(-14\sqrt{2}-9\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}-6\sqrt{5}\,\sqrt{2}-20\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+13\sqrt{5}\,\sqrt{-4+2\sqrt{5}}+9\sqrt{5}+29\sqrt{-4+2\sqrt{5}}+20)\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}\,\ln(1$$
$$+\sqrt{2}\,)+\frac{1}{5}\,\mathrm{I}\sqrt{4+2\,\mathrm{I}}\,\ln(1$$
$$+\sqrt{2}\,)\,\arctan(\frac{1}{2}\,\frac{1}{2\sqrt{5}\,\sqrt{2}+3\sqrt{5}-4\sqrt{2}-7}\,(\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+2\sqrt{5}\,\sqrt{-4+2\sqrt{5}}-3\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+2\sqrt{\sqrt{5}+2}\,\sqrt{2}-4\sqrt{-4+2\sqrt{5}}$$
$$+4\sqrt{\sqrt{5}+2}\,))-\frac{1}{20}\,\mathrm{I}\ln(1+\sqrt{2}\,)\,\sqrt{4-2\,\mathrm{I}}\,\ln(-5\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+4\sqrt{5}\,\sqrt{2}-8\sqrt{5}\,\sqrt{-4+2\sqrt{5}}-13\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+6\sqrt{5}+8\sqrt{2}$$
$$-20\sqrt{-4+2\sqrt{5}}+14)+\frac{1}{20}\,\mathrm{I}\ln(1+\sqrt{2}\,)\,\sqrt{4+2\,\mathrm{I}}\,\ln(-5\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+4\sqrt{5}\,\sqrt{2}-8\sqrt{5}\,\sqrt{-4+2\sqrt{5}}-13\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+6\sqrt{5}+8\sqrt{2}$$
$$-20\sqrt{-4+2\sqrt{5}}+14)+\frac{1}{20}\,\mathrm{I}\ln(1+\sqrt{2}\,)\,\sqrt{4-2\,\mathrm{I}}\,\ln(5\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+4\sqrt{5}\,\sqrt{2}+8\sqrt{5}\,\sqrt{-4+2\sqrt{5}}+13\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+6\sqrt{5}+8\sqrt{2}$$
$$+20\sqrt{-4+2\sqrt{5}}+14)-\frac{1}{20}\,\mathrm{I}\ln(1+\sqrt{2}\,)\,\sqrt{4+2\,\mathrm{I}}\,\ln(5\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+4\sqrt{5}\,\sqrt{2}+8\sqrt{5}\,\sqrt{-4+2\sqrt{5}}+13\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+6\sqrt{5}+8\sqrt{2}$$
$$+20\sqrt{-4+2\sqrt{5}}+14)-\frac{1}{5}\,\mathrm{I}\pi\ln(1+\sqrt{2}\,)\,\sqrt{4+2\,\mathrm{I}}-\frac{1}{5}\,\mathrm{I}\sqrt{4-2\,\mathrm{I}}\,\ln(1$$
$$+\sqrt{2}\,)\,\arctan(\frac{1}{2}\,\frac{1}{2\sqrt{5}\,\sqrt{2}+3\sqrt{5}-4\sqrt{2}-7}\,(\sqrt{5}\,\sqrt{-4+2\sqrt{5}}\,\sqrt{2}$$
$$+2\sqrt{5}\,\sqrt{-4+2\sqrt{5}}-3\sqrt{-4+2\sqrt{5}}\,\sqrt{2}+2\sqrt{\sqrt{5}+2}\,\sqrt{2}-4\sqrt{-4+2\sqrt{5}}$$
$$+4\sqrt{\sqrt{5}+2}\,))+\frac{1}{5}\,\mathrm{I}\pi\ln(1+\sqrt{2}\,)\,\sqrt{4-2\,\mathrm{I}}+\frac{1}{20}\,\arctan(\sqrt{5}\,\sqrt{-4+2\sqrt{5}}$$

$$+\frac{3}{4}\sqrt{5}\sqrt{-4+2\sqrt{5}}\sqrt{2}+2\sqrt{-4+2\sqrt{5}}+\frac{7}{4}\sqrt{-4+2\sqrt{5}}\sqrt{2}\Big)\ln\Big(-14\sqrt{2}$$
$$-9\sqrt{5}\sqrt{-4+2\sqrt{5}}\sqrt{2}-6\sqrt{5}\sqrt{2}-20\sqrt{-4+2\sqrt{5}}\sqrt{2}$$
$$+13\sqrt{5}\sqrt{-4+2\sqrt{5}}+9\sqrt{5}+29\sqrt{-4+2\sqrt{5}}+20\Big)$$
$$-\frac{1}{20}\arctan\Big(\sqrt{5}\sqrt{-4+2\sqrt{5}}+\frac{3}{4}\sqrt{5}\sqrt{-4+2\sqrt{5}}\sqrt{2}+2\sqrt{-4+2\sqrt{5}}$$
$$+\frac{7}{4}\sqrt{-4+2\sqrt{5}}\sqrt{2}\Big)^2\sqrt{5}+\Big(\frac{1}{10}\,\mathrm{I}\sqrt{4+2\,\mathrm{I}}$$
$$-\frac{1}{5}\sqrt{4+2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{-1+\mathrm{I}-\sqrt{4+2\,\mathrm{I}}}{1+\mathrm{I}-\sqrt{4+2\,\mathrm{I}}}\Big)+\Big(\frac{1}{5}\sqrt{4+2\,\mathrm{I}}$$
$$-\frac{1}{10}\,\mathrm{I}\sqrt{4+2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{-1+\mathrm{I}+\sqrt{4+2\,\mathrm{I}}}{1+\mathrm{I}+\sqrt{4+2\,\mathrm{I}}}\Big)+\Big(\frac{1}{5}\sqrt{4-2\,\mathrm{I}}$$
$$+\frac{1}{10}\,\mathrm{I}\sqrt{4-2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{1+\mathrm{I}-\sqrt{4-2\,\mathrm{I}}}{-1+\mathrm{I}-\sqrt{4-2\,\mathrm{I}}}\Big)+\Big(-\frac{1}{5}\sqrt{4-2\,\mathrm{I}}$$
$$-\frac{1}{10}\,\mathrm{I}\sqrt{4-2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{1+\mathrm{I}+\sqrt{4-2\,\mathrm{I}}}{-1+\mathrm{I}+\sqrt{4-2\,\mathrm{I}}}\Big)+\Big(\frac{1}{5}\sqrt{4+2\,\mathrm{I}}$$
$$-\frac{1}{10}\,\mathrm{I}\sqrt{4+2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{-2\sqrt{2}-1+\mathrm{I}-\sqrt{4+2\,\mathrm{I}}}{1+\mathrm{I}-\sqrt{4+2\,\mathrm{I}}}\Big)+\Big(\frac{1}{10}\,\mathrm{I}\sqrt{4+2\,\mathrm{I}}$$
$$-\frac{1}{5}\sqrt{4+2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{-2\sqrt{2}-1+\mathrm{I}+\sqrt{4+2\,\mathrm{I}}}{1+\mathrm{I}+\sqrt{4+2\,\mathrm{I}}}\Big)+\Big(-\frac{1}{5}\sqrt{4-2\,\mathrm{I}}$$
$$-\frac{1}{10}\,\mathrm{I}\sqrt{4-2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{2\sqrt{2}+1+\mathrm{I}-\sqrt{4-2\,\mathrm{I}}}{-1+\mathrm{I}-\sqrt{4-2\,\mathrm{I}}}\Big)+\Big(\frac{1}{5}\sqrt{4-2\,\mathrm{I}}$$
$$+\frac{1}{10}\,\mathrm{I}\sqrt{4-2\,\mathrm{I}}\Big)\operatorname{dilog}\Big(\frac{2\sqrt{2}+1+\mathrm{I}+\sqrt{4-2\,\mathrm{I}}}{-1+\mathrm{I}+\sqrt{4-2\,\mathrm{I}}}\Big)-\frac{1}{80}\ln\Big(-14\sqrt{2}$$
$$-9\sqrt{5}\sqrt{-4+2\sqrt{5}}\sqrt{2}-6\sqrt{5}\sqrt{2}-20\sqrt{-4+2\sqrt{5}}\sqrt{2}$$
$$+13\sqrt{5}\sqrt{-4+2\sqrt{5}}+9\sqrt{5}+29\sqrt{-4+2\sqrt{5}}+20\Big)^2\sqrt{5}$$

$$mf := \int_0^{\ln(1+\sqrt{2})}\frac{2\,x^{r\sim}\,(\sinh(x)-1)\cosh(x)\sinh(x)}{-4\cosh(x)^4+8\sinh(x)\cosh(x)^2-4\sinh(x)+3}\,\mathrm{d}x$$

$$\text{"MF"},\ \int_0^{\ln(1+\sqrt{2})}\frac{2\,x^{r\sim}\,(\sinh(x)-1)\cosh(x)\sinh(x)}{-4\cosh(x)^4+8\sinh(x)\cosh(x)^2-4\sinh(x)+3}\,\mathrm{d}x$$

$$\text{"MGF"},\ -2\left(\int_0^{\ln(1+\sqrt{2})}\frac{\mathrm{e}^{t\,x}\sinh(x)\cosh(x)\,(\sinh(x)-1)}{4\cosh(x)^4-8\sinh(x)\cosh(x)^2+4\sinh(x)-3}\,\mathrm{d}x\right)$$

```
2\,{\frac {\sinh \left( x \right) \cosh \left( x \right)  \left(
\sinh
 \left( x \right) -1 \right) }{-4\, \left( \cosh \left( x
\right)
 \right) ^{4}+8\,\sinh \left( x \right)  \left( \cosh \left( x
 \right)  \right) ^{2}-4\,\sinh \left( x \right) +3}}
```

"i is", 16,

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

$$l := 0$$

$$u := \infty$$

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

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

$$"g(x)", \frac{1}{\tanh(x+1)}, "base", \frac{2x}{(x^2+1)^2}, "LogLogisticRV(1, 2)"$$

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

$$"F(x)", \frac{1}{\operatorname{arctanh}\left(\frac{1}{x}\right)^2 - 2 \operatorname{arctanh}\left(\frac{1}{x}\right) + 2}$$

$$"IDF(x)", \left[\left[s \rightarrow \frac{1}{\tanh\left(\frac{s + \sqrt{-s(s-1)}}{s}\right)} \right], [0, 1], ["Continuous", "IDF"] \right]$$

$$"S(x)", 1 - \frac{1}{\operatorname{arctanh}\left(\frac{1}{x}\right)^2 - 2 \operatorname{arctanh}\left(\frac{1}{x}\right) + 2}$$

$$"h(x)", \frac{2}{\left(-1 + \operatorname{arctanh}\left(\frac{1}{x}\right)\right) (x^2 - 1) \left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2 - 2 \operatorname{arctanh}\left(\frac{1}{x}\right) + 2\right)}$$

$$\text{"mean and variance"}, 2 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x\left(-1+\operatorname{arctanh}\left(\frac{1}{x}\right)\right)}{\left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2-2\operatorname{arctanh}\left(\frac{1}{x}\right)+2\right)^2 (x^2-1)}\,dx \right), 2 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x^2\left(-1+\operatorname{arctanh}\left(\frac{1}{x}\right)\right)}{\left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2-2\operatorname{arctanh}\left(\frac{1}{x}\right)+2\right)^2 (x^2-1)}\,dx \right) - 4 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x\left(-1+\operatorname{arctanh}\left(\frac{1}{x}\right)\right)}{\left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2-2\operatorname{arctanh}\left(\frac{1}{x}\right)+2\right)^2 (x^2-1)}\,dx \right)^2$$

$$mf := \int_1^{\frac{e+e^{-1}}{e-e^{-1}}} \frac{x^{r\sim}\left(-2+2\operatorname{arctanh}\left(\frac{1}{x}\right)\right)}{\left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2-2\operatorname{arctanh}\left(\frac{1}{x}\right)+2\right)^2 (x^2-1)}\,dx$$

$$\text{"MF"}, \int_1^{\frac{e+e^{-1}}{e-e^{-1}}} \frac{x^{r\sim}\left(-2+2\operatorname{arctanh}\left(\frac{1}{x}\right)\right)}{\left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2-2\operatorname{arctanh}\left(\frac{1}{x}\right)+2\right)^2 (x^2-1)}\,dx$$

$$\text{"MGF"}, 2 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{e^{tx}\left(-1+\operatorname{arctanh}\left(\frac{1}{x}\right)\right)}{\left(\operatorname{arctanh}\left(\frac{1}{x}\right)^2-2\operatorname{arctanh}\left(\frac{1}{x}\right)+2\right)^2 (x^2-1)}\,dx \right)$$

```
{\frac {-2+2\,{\rm arctanh} \left({x}^{-1}\right)}{ \left(
\left(
{\rm arctanh} \left({x}^{-1}\right) \right) ^{2}-2\,{\rm
arctanh}
\left({x}^{-1}\right)+2 \right) ^{2} \left( {x}^{2}-1 \right) }}
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"i is", 17,

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \frac{1}{\sinh(x+1)}, \text{"base"}, \frac{2x}{(x^2+1)^2}, \text{"LogLogisticRV(1, 2)"}$$

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

$$\text{"F(x)"}, 1 \Big/ \left(\ln\left(\sqrt{x^2+1}+1\right)^2 - 2\ln\left(\sqrt{x^2+1}+1\right)\ln(x) + \ln(x)^2 - 2\ln\left(\sqrt{x^2+1}+1\right) + 2\ln(x) + 2\right)$$

$$\text{"IDF(x)"}, [[\ ], [0, 1], ["Continuous", "IDF"]]$$

$$\text{"S(x)"}, \left(\ln\left(\sqrt{x^2+1}+1\right)^2 - 2\ln\left(\sqrt{x^2+1}+1\right)\ln(x) + \ln(x)^2 - 2\ln\left(\sqrt{x^2+1}+1\right) + 2\ln(x) + 1\right) \Big/ \left(\ln\left(\sqrt{x^2+1}+1\right)^2 - 2\ln\left(\sqrt{x^2+1}+1\right)\ln(x) + \ln(x)^2 - 2\ln\left(\sqrt{x^2+1}+1\right) + 2\ln(x) + 2\right)$$

$$\text{"h(x)"}, \left(2\left(-1 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)\left(\ln\left(\sqrt{x^2+1}+1\right)^2 - 2\ln\left(\sqrt{x^2+1}+1\right)\ln(x) + \ln(x)^2 - 2\ln\left(\sqrt{x^2+1}+1\right) + 2\ln(x) + 2\right)\right) \Big/ \left(\sqrt{x^2+1}\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2 - 2\operatorname{arcsinh}\left(\frac{1}{x}\right) + 2\right)^2 |x| \left(\ln\left(\sqrt{x^2+1}+1\right)^2 - 2\ln\left(\sqrt{x^2+1}+1\right)\ln(x) + \ln(x)^2 - 2\ln\left(\sqrt{x^2+1}+1\right) + 2\ln(x) + 1\right)\right)$$

$$"mean and variance", 2 \left(\int_0^{\frac{2\,e}{e^2-1}} \frac{-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)}{\sqrt{x^2+1}\,\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)+2\right)^2}\,dx \right), 2 \left(\int_0^{\frac{2\,e}{e^2-1}} \frac{x\left(-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)\right)}{\sqrt{x^2+1}\,\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)+2\right)^2}\,dx \right) - 4 \left(\int_0^{\frac{2\,e}{e^2-1}} \frac{-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)}{\sqrt{x^2+1}\,\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)+2\right)^2}\,dx \right)^2$$

$$mf := \int_0^{-\frac{2}{-e+e^{-1}}} \frac{2\,x^{r\sim}\left(-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)\right)}{\sqrt{x^2+1}\,\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)+2\right)^2 |x|}\,dx$$

$$"MF", \int_0^{-\frac{2}{-e+e^{-1}}} \frac{2\,x^{r\sim}\left(-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)\right)}{\sqrt{x^2+1}\,\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)+2\right)^2 |x|}\,dx$$

$$"MGF", 2 \left(\int_0^{\frac{2\,e}{e^2-1}} \frac{e^{t\,x}\left(-1+\operatorname{arcsinh}\left(\frac{1}{x}\right)\right)}{\sqrt{x^2+1}\,\left(\operatorname{arcsinh}\left(\frac{1}{x}\right)^2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)+2\right)^2 x}\,dx \right)$$

```
2\,{\frac {-1+{\rm arcsinh} \left({x}^{-1}\right)}{\sqrt {{x}^
{2}+1}
 \left(  \left( {\rm arcsinh} \left({x}^{-1}\right) \right) ^{2}
-2\,
{\rm arcsinh} \left({x}^{-1}\right)+2 \right) ^{2} \left| x
\right| }}
```

"i is", 18,

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to -\left(2\left(-1+\sinh\left(\frac{1}{y\sim}\right)\right)\cosh\left(\frac{1}{y\sim}\right)\right)\Big/\left(y\sim^2\left(-\cosh\left(\frac{1}{y\sim}\right)^4 + 4\sinh\left(\frac{1}{y\sim}\right)\cosh\left(\frac{1}{y\sim}\right)^2 - 6\cosh\left(\frac{1}{y\sim}\right)^2 + 4\sinh\left(\frac{1}{y\sim}\right) + 3\right)\right)\right], \left[0, \frac{1}{\ln\left(1+\sqrt{2}\right)}\right], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \frac{1}{\operatorname{arcsinh}(x+1)}, \text{"base"}, \frac{2x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, -\frac{2\left(-1+\sinh\left(\frac{1}{x}\right)\right)\cosh\left(\frac{1}{x}\right)}{x^2\left(-\cosh\left(\frac{1}{x}\right)^4 + 4\sinh\left(\frac{1}{x}\right)\cosh\left(\frac{1}{x}\right)^2 - 6\cosh\left(\frac{1}{x}\right)^2 + 4\sinh\left(\frac{1}{x}\right) + 3\right)}$$

$$\text{"F(x)"}, \frac{4\,\mathrm{e}^{\frac{2}{x}}}{\mathrm{e}^{\frac{4}{x}} - 4\,\mathrm{e}^{\frac{3}{x}} + 6\,\mathrm{e}^{\frac{2}{x}} + 4\,\mathrm{e}^{\frac{1}{x}} + 1}$$

$$\text{"IDF(x)"}, \left[\left[s \to \frac{1}{\ln\left(RootOf\left(s\,\_Z^4 - 4\,s\,\_Z^3 + (6\,s-4)\,\_Z^2 + 4\,s\,\_Z + s\right)\right)}\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{\mathrm{e}^{\frac{4}{x}} - 4\,\mathrm{e}^{\frac{3}{x}} + 2\,\mathrm{e}^{\frac{2}{x}} + 4\,\mathrm{e}^{\frac{1}{x}} + 1}{\mathrm{e}^{\frac{4}{x}} - 4\,\mathrm{e}^{\frac{3}{x}} + 6\,\mathrm{e}^{\frac{2}{x}} + 4\,\mathrm{e}^{\frac{1}{x}} + 1}$$

$$\text{"h(x)"}, -\left(2\left(-1+\sinh\left(\frac{1}{x}\right)\right)\cosh\left(\frac{1}{x}\right)\left(\mathrm{e}^{\frac{4}{x}} - 4\,\mathrm{e}^{\frac{3}{x}} + 6\,\mathrm{e}^{\frac{2}{x}} + 4\,\mathrm{e}^{\frac{1}{x}} + 1\right)\right)\Big/\left(x^2\left(-\cosh\left(\frac{1}{x}\right)^4 + 4\sinh\left(\frac{1}{x}\right)\cosh\left(\frac{1}{x}\right)^2 - 6\cosh\left(\frac{1}{x}\right)^2 + 4\sinh\left(\frac{1}{x}\right) + 3\right)\left(\mathrm{e}^{\frac{4}{x}} - 4\,\mathrm{e}^{\frac{3}{x}} + 2\,\mathrm{e}^{\frac{2}{x}} + 4\,\mathrm{e}^{\frac{1}{x}} + 1\right)\right)$$

"No Mean/Variance"

$$mf := \int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(- \frac{2\, x^{r\sim} \left(-1+\sinh\left(\frac{1}{x}\right)\right) \cosh\left(\frac{1}{x}\right)}{x^2 \left(-\cosh\left(\frac{1}{x}\right)^4 + 4\sinh\left(\frac{1}{x}\right)\cosh\left(\frac{1}{x}\right)^2 - 6\cosh\left(\frac{1}{x}\right)^2 + 4\sinh\left(\frac{1}{x}\right) + 3\right)} \right) dx$$

$$\text{"MF"}, \int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(- \frac{2\, x^{r\sim} \left(-1+\sinh\left(\frac{1}{x}\right)\right) \cosh\left(\frac{1}{x}\right)}{x^2 \left(-\cosh\left(\frac{1}{x}\right)^4 + 4\sinh\left(\frac{1}{x}\right)\cosh\left(\frac{1}{x}\right)^2 - 6\cosh\left(\frac{1}{x}\right)^2 + 4\sinh\left(\frac{1}{x}\right) + 3\right)} \right) dx$$

$$\text{"MGF"}, 2 \left(\int_0^{\frac{1}{\ln(1+\sqrt{2})}} \frac{e^{t x} \cosh\left(\frac{1}{x}\right) \left(-1+\sinh\left(\frac{1}{x}\right)\right)}{x^2 \left(\cosh\left(\frac{1}{x}\right)^4 - 4\sinh\left(\frac{1}{x}\right)\cosh\left(\frac{1}{x}\right)^2 + 6\cosh\left(\frac{1}{x}\right)^2 - 4\sinh\left(\frac{1}{x}\right) - 3\right)} dx \right)$$

```
-2\,{\frac {\cosh \left( {x}^{-1} \right)  \left( -1+\sinh \left
( {x}^
{-1} \right)  \right) }{{x}^{2} \left( - \left( \cosh \left( {x}
^{-1}
 \right)  \right) ^{4}+4\,\sinh \left( {x}^{-1} \right)  \left(
```

```
\cosh
 \left( {x}^{-1} \right)  \right) ^{2}-6\, \left( \cosh \left(
{x}^{-1
} \right)  \right) ^{2}+4\,\sinh \left( {x}^{-1} \right) +3
\right) }}
```

"i is", 19,

" --"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

$$\text{"g(x)"}, \frac{1}{\operatorname{csch}(x)} + 1, \text{"base"}, \frac{2\, x}{(x^2 + 1)^2}, \text{"LogLogisticRV(1, 2)"}$$

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

$$\text{"F(x)"}, 2 \left(\int_1^x \frac{\operatorname{arccsch}\left(\frac{1}{t - 1}\right)}{\sqrt{t^2 - 2\, t + 2}\, \left(\operatorname{arccsch}\left(\frac{1}{t - 1}\right)^2 + 1\right)^2}\, dt \right)$$

"IDF did not work"

$$\text{"S(x)"}, 1 - 2 \left(\int_1^x \frac{\operatorname{arccsch}\left(\frac{1}{t - 1}\right)}{\sqrt{t^2 - 2\, t + 2}\, \left(\operatorname{arccsch}\left(\frac{1}{t - 1}\right)^2 + 1\right)^2}\, dt \right)$$

$$\text{"h(x)"}, -\left(2 \operatorname{arccsch}\left(\frac{1}{x - 1}\right)\right) \Bigg/ \Bigg(\sqrt{x^2 - 2\, x + 2}\, \left(\operatorname{arccsch}\left(\frac{1}{x - 1}\right)^2 + 1\right)^2 \Bigg(-1 + 2 \Bigg($$

$$\int_1^x \frac{\operatorname{arccsch}\left(\frac{1}{t-1}\right)}{\sqrt{t^2-2t+2}\left(\operatorname{arccsch}\left(\frac{1}{t-1}\right)^2+1\right)^2}\,dt\Bigg)\Bigg)\Bigg)$$

"mean and variance", ∞, *undefined*

$$mf := \infty$$

"MF", ∞

$$\text{"MGF"}, \int_1^\infty \frac{2\,e^{tx}\operatorname{arccsch}\left(\frac{1}{x-1}\right)}{\sqrt{x^2-2x+2}\left(\operatorname{arccsch}\left(\frac{1}{x-1}\right)^2+1\right)^2}\,dx$$

```
2\,{\frac {{\rm arccsch} \left( \left( x-1 \right) ^{-1}\right)}
{
\sqrt {{x}^{2}-2\,x+2} \left(  \left( {\rm arccsch} \left( \left
( x-1
 \right) ^{-1}\right) \right) ^{2}+1 \right) ^{2}}}
```

"i is", 20,

" --"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

$$\text{"g(x)"}, \tanh\left(\frac{1}{x}\right), \text{"base"}, \frac{2x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

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

$$\text{"F(x)"}, \frac{\operatorname{arctanh}(x)^2}{\operatorname{arctanh}(x)^2+1}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \to -\tanh\left(\frac{\sqrt{-(s-1)\,s}}{s-1}\right)\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$

$$\text{"S(x)"}, \frac{1}{\operatorname{arctanh}(x)^2+1}$$

$$\text{"h(x)"}, -\frac{2\operatorname{arctanh}(x)}{\left(\operatorname{arctanh}(x)^2+1\right)\left(x^2-1\right)}$$

"mean and variance", $-2\left(\int_0^1 \frac{x\,\mathrm{arctanh}(x)}{\left(\mathrm{arctanh}(x)^2+1\right)^2\left(x^2-1\right)}\,\mathrm{d}x\right)$, $-2\left(\int_0^1 \frac{x^2\,\mathrm{arctanh}(x)}{\left(\mathrm{arctanh}(x)^2+1\right)^2\left(x^2-1\right)}\,\mathrm{d}x\right)-4\left(\int_0^1 \frac{x\,\mathrm{arctanh}(x)}{\left(\mathrm{arctanh}(x)^2+1\right)^2\left(x^2-1\right)}\,\mathrm{d}x\right)^2$

$$mf := \int_0^1 \left(-\frac{2\,x^{r\sim}\,\mathrm{arctanh}(x)}{\left(\mathrm{arctanh}(x)^2+1\right)^2\left(x^2-1\right)}\right)\mathrm{d}x$$

$$\text{"MF"},\ \int_0^1 \left(-\frac{2\,x^{r\sim}\,\mathrm{arctanh}(x)}{\left(\mathrm{arctanh}(x)^2+1\right)^2\left(x^2-1\right)}\right)\mathrm{d}x$$

$$\text{"MGF"},\ -2\left(\int_0^1 \frac{e^{tx}\,\mathrm{arctanh}(x)}{\left(\mathrm{arctanh}(x)^2+1\right)^2\left(x^2-1\right)}\,\mathrm{d}x\right)$$

```
-2\,{\frac {{\rm arctanh} \left(x\right)}{ \left(  \left(
{\rm arctanh} \left(x\right) \right) ^{2}+1 \right) ^{2} \left(
{x}^{2
}-1 \right) }}
```

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"},\ \mathrm{csch}\left(\frac{1}{x}\right), \text{"base"},\ \frac{2\,x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"},\ \frac{2\,\mathrm{arccsch}(x)}{\sqrt{x^2+1}\,\left(\mathrm{arccsch}(x)^2+1\right)^2 |x|}$$

$$\text{"F(x)"},\ 2\left(\int_0^x \frac{\mathrm{arccsch}(t)}{\sqrt{t^2+1}\,\left(\mathrm{arccsch}(t)^2+1\right)^2 |t|}\,\mathrm{d}t\right)$$

"IDF did not work"

$$\text{"S(x)"},\ 1-2\left(\int_0^x \frac{\mathrm{arccsch}(t)}{\sqrt{t^2+1}\,\left(\mathrm{arccsch}(t)^2+1\right)^2 |t|}\,\mathrm{d}t\right)$$

$$\text{"h(x)"}, -\frac{2\,\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2+1\right)^2 |x| \left(-1+2\left(\int_0^x \frac{\operatorname{arccsch}(t)}{\sqrt{t^2+1}\,\left(\operatorname{arccsch}(t)^2+1\right)^2 |t|}\,dt\right)\right)}$$

$$\text{"mean and variance"}, \int_0^\infty \frac{2\,\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2+1\right)^2}\,dx,\ \infty$$

$$-\left(\int_0^\infty \frac{2\,\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2+1\right)^2}\,dx\right)^2$$

$$mf := \int_0^\infty \frac{2\,x^{r\sim}\,\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2+1\right)^2 |x|}\,dx$$

$$\text{"MF"}, \int_0^\infty \frac{2\,x^{r\sim}\,\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2+1\right)^2 |x|}\,dx$$

$$\text{"MGF"}, \int_0^\infty \frac{2\,e^{t\,x}\,\operatorname{arccsch}(x)}{\sqrt{x^2+1}\,\left(\operatorname{arccsch}(x)^2+1\right)^2 x}\,dx$$

```
2\,{\frac {{\rm arccsch} \left(x\right)}{\sqrt {{x}^{2}+1} \left
(
 \left( {\rm arccsch} \left(x\right) \right) ^{2}+1 \right) ^{2}
 \left| x \right| }}
```

"i is", 22,

" --"

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow \frac{2\,\sinh(y\sim)}{\cosh(y\sim)^3}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \operatorname{arccsch}\left(\frac{1}{x}\right), \text{"base"}, \frac{2\,x}{\left(x^2+1\right)^2}, \text{"LogLogisticRV(1, 2)"}$$

$$\text{"f(x)"}, \frac{2\,\sinh(x)}{\cosh(x)^3}$$

$$\text{"F(x)"}, \frac{e^{4\,x}-2\,e^{2\,x}+1}{e^{4\,x}+2\,e^{2\,x}+1}$$

ERROR(IDF): Could not find the appropriate inverse

$$"\mathrm{IDF(x)}", \left[\left[s \rightarrow \frac{1}{2} \ln\left(-\frac{s+1+2\sqrt{s}}{s-1}\right)\right], [0, 1], ["\mathrm{Continuous}", "\mathrm{IDF}"]\right]$$

$$"\mathrm{S(x)}", \frac{4\,\mathrm{e}^{2x}}{\mathrm{e}^{4x}+2\,\mathrm{e}^{2x}+1}$$

$$"\mathrm{h(x)}", \frac{1}{2}\,\frac{\sinh(x)\left(\mathrm{e}^{2x}+2+\mathrm{e}^{-2x}\right)}{\cosh(x)^3}$$

$$"\text{mean and variance}", 1, 2\ln(2)-1$$

$$mf := \int_0^\infty \frac{2\,x^{r\sim}\sinh(x)}{\cosh(x)^3}\,\mathrm{d}x$$

$$"\mathrm{MF}", \int_0^\infty \frac{2\,x^{r\sim}\sinh(x)}{\cosh(x)^3}\,\mathrm{d}x$$

$$"\mathrm{MGF}", \int_0^\infty \frac{2\,\mathrm{e}^{tx}\sinh(x)}{\cosh(x)^3}\,\mathrm{d}x$$

```
2\,{\frac {\sinh \left( x \right) }{ \left( \cosh \left( x
\right)
 \right) ^{3}}}
```