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

$$bf := \left[\left[x \rightarrow 2\,x\,\mathrm{e}^{-x^2}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

```
> #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:/Latex_Output_2/mumph.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("Mean and Variance did not work") 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);
  if i=18 then print("MGF didn't work") else print("MGF", MGF
(Temp)) end if;
  #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 if i=18 then= ", 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 $$ \mu=");
  if i=18 then print("Unable to find Mean") else latex(Mean(Temp)
) end if;
  printf("$$ Variance \n $$ \sigma^2 = ");
  if i=18 then print("Unable to find Variance") else latex
(Variance(Temp)) end if;
  printf("$$");
  printf("Moment Function \n $$ m(x) = ");
  latex(mf);
  printf("$$ Moment Generating Function \n $$");
  if i=18 then print("unable to calculate MGF") else latex(MGF
(Temp)[1]) end if;
  printf("$$");
  #latex(MGF(Temp)[1]);

  writeto(terminal);


od;

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

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

$$2\,x\,\mathrm{e}^{-x^2}$$

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := [[y\sim \rightarrow \mathrm{e}^{-y\sim}], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]]$$

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

$$\text{"g(x)"}, x^2, \text{"base"}, 2\,x\,\mathrm{e}^{-x^2}, \text{"WeibullRV(1,2)"}$$

$$\text{"f(x)"}, \mathrm{e}^{-x}$$

$$\text{"F(x)"}, 1 - \mathrm{e}^{-x}$$

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

$$"S(x)", e^{-x}$$
$$"h(x)", 1$$
$$"mean and variance", 1, 1$$
$$mf := \Gamma(r\sim + 1)$$
$$"MF", \Gamma(r\sim + 1)$$
$$"MGF", \lim_{x\to\infty} \frac{e^{x(t-1)} - 1}{t-1}$$

```
{{\rm e}^{-x}}
```

"i is", 2,

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

$$g := t \to \sqrt{t}$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y\sim \to 4\, y\sim^3\, e^{-y\sim^4}\right], [0, \infty], ["Continuous", "PDF"]\right]$$
$$"l and u", 0, \infty$$
$$"g(x)", \sqrt{x}, "base", 2\, x\, e^{-x^2}, "WeibullRV(1,2)"$$
$$"f(x)", 4\, x^3\, e^{-x^4}$$
$$"F(x)", 1 - e^{-x^4}$$
$$"IDF(x)", \left[\left[s \to (-\ln(1-s))^{1/4}\right], [0, 1], ["Continuous", "IDF"]\right]$$
$$"S(x)", e^{-x^4}$$
$$"h(x)", 4\, x^3$$
$$"mean and variance", \frac{1}{4}\, \frac{\pi\sqrt{2}}{\Gamma\left(\frac{3}{4}\right)}, \frac{1}{2}\sqrt{\pi} - \frac{1}{8}\, \frac{\pi^2}{\Gamma\left(\frac{3}{4}\right)^2}$$
$$mf := \Gamma\left(\frac{1}{4}\, r\sim + 1\right)$$
$$"MF", \Gamma\left(\frac{1}{4}\, r\sim + 1\right)$$

$$"MGF", \frac{1}{8}\, \frac{1}{\Gamma\left(\frac{3}{4}\right)\sqrt{\pi}} \Bigg(\Gamma\left(\frac{3}{4}\right)^2 \mathrm{hypergeom}\left([\,], \left[\frac{5}{4}, \frac{3}{2}\right], \frac{1}{256}\, t^4\right) t^3 \sqrt{\pi}$$
$$+ 2\, \pi^{3/2} \sqrt{2}\, \mathrm{hypergeom}\left([\,], \left[\frac{1}{2}, \frac{3}{4}\right], \frac{1}{256}\, t^4\right) t + 2\, \pi\, \Gamma\left(\frac{3}{4}\right) \mathrm{hypergeom}\left([\,], \left[\frac{3}{4}, \frac{5}{4}\right], \frac{1}{256}\, t^4\right) t^2 + 8\, \Gamma\left(\frac{3}{4}\right) \mathrm{hypergeom}\left([1], \left[\frac{1}{4}, \frac{1}{2}, \frac{3}{4}\right], \frac{1}{256}\, t^4\right) \sqrt{\pi}\Bigg)$$

```
4\,{x}^{3}{{\rm e}^{-{x}^{4}}}
```

"i is", 3,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{2\,\mathrm{e}^{-\frac{1}{y\sim^2}}}{y\sim^3}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

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

$$\text{"f(x)"}, \frac{2\,\mathrm{e}^{-\frac{1}{x^2}}}{x^3}$$

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

$$\text{"mean and variance"}, \sqrt{\pi}, \infty$$

$$mf := \Gamma\left(-\frac{1}{2}\,r\sim + 1\right)$$

$$\text{"MF"}, \Gamma\left(-\frac{1}{2}\,r\sim + 1\right)$$

$$\text{"MGF"}, \frac{\mathrm{MeijerG}\left([[\ ], [\ ]], \left[\left[1, \frac{1}{2}, 0\right], [\ ]\right], \frac{1}{4}\,t^2\right)}{\sqrt{\pi}}$$

```
2\,{\frac {1}{{x}^{3}}{{\rm e}^{-{x}^{-2}}}}
```

"i is", 4,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{2\sin(y\sim)\, e^{-\frac{\sin(y\sim)^2}{\cos(y\sim)^2}}}{\cos(y\sim)^3}\right], \left[0, \frac{1}{2}\pi\right], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \arctan(x), \text{"base"}, 2\, x\, e^{-x^2}, \text{"WeibullRV(1,2)"}$$

$$\text{"f(x)"}, \frac{2\sin(x)\, e^{-\frac{\sin(x)^2}{\cos(x)^2}}}{\cos(x)^3}$$

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

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

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

$$\text{"h(x)"}, \frac{2\sin(x)}{\cos(x)^3}$$

$$\text{"mean and variance"}, 2\left(\int_0^{\frac{1}{2}\pi} \frac{x\, e^{\frac{-1+\cos(2x)}{\cos(2x)+1}} \sin(x)}{\cos(x)^3}\, dx\right), 2\left(\int_0^{\frac{1}{2}\pi} \frac{x^2\, e^{\frac{-1+\cos(2x)}{\cos(2x)+1}} \sin(x)}{\cos(x)^3}\, dx\right)$$

$$-4\left(\int_0^{\frac{1}{2}\pi} \frac{x\, e^{\frac{-1+\cos(2x)}{\cos(2x)+1}} \sin(x)}{\cos(x)^3}\, dx\right)^2$$

$$mf := \int_0^{\frac{1}{2}\pi} \frac{2\, x^{r\sim} \sin(x)\, e^{-\frac{\sin(x)^2}{\cos(x)^2}}}{\cos(x)^3}\, dx$$

$$\text{"MF"}, \int_0^{\frac{1}{2}\pi} \frac{2\, x^{r\sim} \sin(x)\, e^{-\frac{\sin(x)^2}{\cos(x)^2}}}{\cos(x)^3}\, dx$$

$$\text{"MGF"}, 2\left(\int_0^{\frac{1}{2}\pi} \frac{e^{\frac{t\, x\cos(2x) + t\, x + \cos(2x) - 1}{\cos(2x)+1}} \sin(x)}{\cos(x)^3}\, dx\right)$$

```
2\,{\frac {\sin \left( x \right) }{ \left( \cos \left( x \right)
```

```
 \right) ^{3}}{{\rm e}^{-{\frac { \left( \sin \left( x \right)
 \right) ^{2}}{ \left( \cos \left( x \right)  \right) ^{2}}}}}}
```

"i is", 5,

" ---"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

$$\text{"S(x)"}, e^{-\ln(x)^2}$$

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

$$\text{"mean and variance"}, 1 + \frac{1}{2} \sqrt{\pi}\, e^{\frac{1}{4}} \operatorname{erf}\left(\frac{1}{2}\right) + \frac{1}{2} \sqrt{\pi}\, e^{\frac{1}{4}}, \sqrt{\pi}\, e \operatorname{erf}(1) + \sqrt{\pi}\, e$$
$$- \sqrt{\pi}\, e^{\frac{1}{4}} \operatorname{erf}\left(\frac{1}{2}\right) - \sqrt{\pi}\, e^{\frac{1}{4}} - \frac{1}{4} \pi\, e^{\frac{1}{2}} \operatorname{erf}\left(\frac{1}{2}\right)^2 - \frac{1}{2} \pi\, e^{\frac{1}{2}} \operatorname{erf}\left(\frac{1}{2}\right) - \frac{1}{4} \pi\, e^{\frac{1}{2}}$$

$$mf := 1 + \frac{1}{2} r\sim \sqrt{\pi}\, e^{\frac{1}{4} r\sim^2} \operatorname{erf}\left(\frac{1}{2} r\sim\right) + \frac{1}{2} r\sim \sqrt{\pi}\, e^{\frac{1}{4} r\sim^2}$$

$$\text{"MF"}, 1 + \frac{1}{2} r\sim \sqrt{\pi}\, e^{\frac{1}{4} r\sim^2} \operatorname{erf}\left(\frac{1}{2} r\sim\right) + \frac{1}{2} r\sim \sqrt{\pi}\, e^{\frac{1}{4} r\sim^2}$$

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

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

"i is", 6,

" ---"

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \ln(x), \text{"base"}, 2\,x\,\mathrm{e}^{-x^2}, \text{"WeibullRV(1,2)"}$$

$$\text{"f(x)"}, 2\,\mathrm{e}^{2\,x - \mathrm{e}^{2\,x}}$$

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

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

$$\text{"S(x)"}, \mathrm{e}^{-\mathrm{e}^{2\,x}}$$

$$\text{"h(x)"}, 2\,\mathrm{e}^{2\,x}$$

$$\text{"mean and variance"}, \int_{-\infty}^{\infty} 2\,x\,\mathrm{e}^{2\,x - \mathrm{e}^{2\,x}}\,\mathrm{d}x, \int_{-\infty}^{\infty} 2\,x^2\,\mathrm{e}^{2\,x - \mathrm{e}^{2\,x}}\,\mathrm{d}x - \left(\int_{-\infty}^{\infty} 2\,x\,\mathrm{e}^{2\,x - \mathrm{e}^{2\,x}}\,\mathrm{d}x\right)^2$$

$$mf := \int_{-\infty}^{\infty} 2\,x^{r\sim}\,\mathrm{e}^{2\,x - \mathrm{e}^{2\,x}}\,\mathrm{d}x$$

$$\text{"MF"}, \int_{-\infty}^{\infty} 2\,x^{r\sim}\,\mathrm{e}^{2\,x - \mathrm{e}^{2\,x}}\,\mathrm{d}x$$

$$\text{"MGF"}, \int_{-\infty}^{\infty} 2\,\mathrm{e}^{t\,x + 2\,x - \mathrm{e}^{2\,x}}\,\mathrm{d}x$$

```
2\,{{\rm e}^{2\,x-{{\rm e}^{2\,x}}}}
```

"i is", 7,

" --"

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \mathrm{e}^{-x}, \text{"base"}, 2\,x\,\mathrm{e}^{-x^2}, \text{"WeibullRV(1,2)"}$$

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

$$\text{"F(x)"}, \mathrm{e}^{-\ln(x)^2}$$

ERROR(IDF): Could not find the appropriate inverse

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

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

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

"mean and variance", $1+\frac{1}{2}\sqrt{\pi}\,\mathrm{e}^{\frac{1}{4}}\,\mathrm{erf}\left(\frac{1}{2}\right)-\frac{1}{2}\sqrt{\pi}\,\mathrm{e}^{\frac{1}{4}}, \sqrt{\pi}\,\mathrm{e}\,\mathrm{erf}(1)-\sqrt{\pi}\,\mathrm{e}$

$$-\sqrt{\pi}\,\mathrm{e}^{\frac{1}{4}}\,\mathrm{erf}\left(\frac{1}{2}\right)+\sqrt{\pi}\,\mathrm{e}^{\frac{1}{4}}-\frac{1}{4}\pi\,\mathrm{e}^{\frac{1}{2}}\,\mathrm{erf}\left(\frac{1}{2}\right)^2+\frac{1}{2}\pi\,\mathrm{e}^{\frac{1}{2}}\,\mathrm{erf}\left(\frac{1}{2}\right)-\frac{1}{4}\pi\,\mathrm{e}^{\frac{1}{2}}$$

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

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

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

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

"i is", 8,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, -\ln(x), \text{"base"}, 2x\,\mathrm{e}^{-x^2}, \text{"WeibullRV(1,2)"}$$

$$\text{"f(x)"}, 2\,\mathrm{e}^{-2x-\mathrm{e}^{-2x}}$$

$$\text{"F(x)"}, \mathrm{e}^{-\mathrm{e}^{-2x}}$$

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

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

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

$$\text{"mean and variance"}, \int_{-\infty}^{\infty} 2x\,\mathrm{e}^{-2x-\mathrm{e}^{-2x}}\,\mathrm{d}x, \int_{-\infty}^{\infty} 2x^2\,\mathrm{e}^{-2x-\mathrm{e}^{-2x}}\,\mathrm{d}x-\left(\int_{-\infty}^{\infty} 2x\,\mathrm{e}^{-2x-\mathrm{e}^{-2x}}\,\mathrm{d}x\right)^2$$

$$mf := \int_{-\infty}^{\infty} 2x^{r\sim}\,\mathrm{e}^{-2x-\mathrm{e}^{-2x}}\,\mathrm{d}x$$

$$\text{"MF"}, \int_{-\infty}^{\infty} 2x^{r\sim}\,\mathrm{e}^{-2x-\mathrm{e}^{-2x}}\,\mathrm{d}x$$

$$\text{"MGF"}, \int_{-\infty}^{\infty} 2\, e^{t x - 2 x - e^{-2 x}}\, dx$$

```
2\,{{\rm e}^{-2\,x-{{\rm e}^{-2\,x}}}}
```

"i is", 9,

" ---"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

$$\text{"mean and variance"}, \int_{0}^{\infty} 2\, x\left(e^{x} - 1\right) e^{-e^{2x} + 2 e^{x} + x - 1}\, dx, \int_{0}^{\infty} 2\, x^2\left(e^{x} - 1\right) e^{-e^{2x} + 2 e^{x} + x - 1}\, dx - \left(\int_{0}^{\infty} 2\, x\left(e^{x} - 1\right) e^{-e^{2x} + 2 e^{x} + x - 1}\, dx\right)^2$$

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

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

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

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

"i is", 10,

" ---"

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

$$mf := \int_{0}^{\frac{1}{\ln(2)}} \frac{2\, x^{r\sim} \left(e^{\frac{1}{x}} - 2\right) e^{-\frac{e^{\frac{2}{x}} x - 4 e^{\frac{1}{x}} x + 4 x - 1}{x}}}{x^2}\, dx$$

$$\text{"MF"}, \int_{0}^{\frac{1}{\ln(2)}} \frac{2\, x^{r\sim} \left(e^{\frac{1}{x}} - 2\right) e^{-\frac{e^{\frac{2}{x}} x - 4 e^{\frac{1}{x}} x + 4 x - 1}{x}}}{x^2}\, dx$$

$$\text{"MGF"}, 2 \left(\int_{0}^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}} - 2\right) e^{-\frac{e^{\frac{2}{x}} x - t x^2 - 4 e^{\frac{1}{x}} x + 4 x - 1}{x}}}{x^2}\, dx \right)$$

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

"i is", 11,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$\text{"g(x)"}, \tanh(x), \text{"base"}, 2\, x\, e^{-x^2}, \text{"WeibullRV(1,2)"}$$

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

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

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

$$\text{"S(x)"}, \frac{\sqrt{(x+1)^{\ln(1-x)}}\, e^{-\frac{1}{4}\ln(x+1)^2}}{\left(e^{\ln(1-x)^2}\right)^{1/4}}$$

$$"h(x)",\ -\frac{2\,\mathrm{arctanh}(x)\,\mathrm{e}^{-\frac{1}{4}\,(2\,\mathrm{arctanh}(x)\,-\,\ln(x+1))\,(2\,\mathrm{arctanh}(x)\,+\,\ln(x+1))}\,\left(\mathrm{e}^{\ln(1-x)^2}\right)^{1/4}}{\sqrt{(1-x)^{\ln(x+1)}}\,\left(x^2-1\right)}$$

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

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

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

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

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

"i is", 12,

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

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

$$l := 0$$

$$u := \infty$$

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

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

$$"g(x)",\ \sinh(x),\ "base",\ 2\,x\,\mathrm{e}^{-x^2},\ "WeibullRV(1,2)"$$

$$"f(x)",\ \frac{2\,\mathrm{arcsinh}(x)\,\mathrm{e}^{-\mathrm{arcsinh}(x)^2}}{\sqrt{x^2+1}}$$

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

$$"MF",\ \int_0^{\infty}\frac{2\,x^{r\sim}\,\mathrm{arcsinh}(x)\,e^{-\mathrm{arcsinh}(x)^2}}{\sqrt{x^2+1}}\,dx$$

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

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

"i is", 13,

" --"

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

$$l := 0$$

$$u := \infty$$

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

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

$$"g(x)",\ \mathrm{arcsinh}(x),\ "base",\ 2\,x\,e^{-x^2},\ "WeibullRV(1,2)"$$

$$"f(x)",\ 2\,\sinh(x)\,e^{-\sinh(x)^2}\cosh(x)$$

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

ERROR(IDF): Could not find the appropriate inverse

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

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

$$\text{"h(x)"}, 2\sinh(x)\,\mathrm{e}^{-\cosh(x)^2+\frac{1}{2}+\frac{1}{4}\mathrm{e}^{-2x}+\frac{1}{4}\mathrm{e}^{2x}}\cosh(x)$$

$$\text{"mean and variance"}, \int_0^{\infty}\mathrm{e}^{\frac{1}{2}-\frac{1}{2}\cosh(2x)}\,x\sinh(2x)\,\mathrm{d}x, \int_0^{\infty}\mathrm{e}^{\frac{1}{2}-\frac{1}{2}\cosh(2x)}\,x^2\sinh(2x)\,\mathrm{d}x$$
$$-\left(\int_0^{\infty}\mathrm{e}^{\frac{1}{2}-\frac{1}{2}\cosh(2x)}\,x\sinh(2x)\,\mathrm{d}x\right)^2$$

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

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

$$\text{"MGF"}, \int_0^{\infty}\mathrm{e}^{tx+\frac{1}{2}-\frac{1}{2}\cosh(2x)}\sinh(2x)\,\mathrm{d}x$$

```
2\,\sinh \left( x \right) {{\rm e}^{- \left( \sinh \left( x
\right)
 \right) ^{2}}}\cosh \left( x \right)
```

"i is", 14,

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

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

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

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

$$\text{"g(x)"}, \operatorname{csch}(x+1), \text{"base"}, 2\,x\,\mathrm{e}^{-x^2}, \text{"WeibullRV(1,2)"}$$

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

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

"IDF did not work"

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

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

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

$$-4\left(\int_0^{\frac{2e}{e^2-1}} \frac{(-1+\operatorname{arccsch}(x))\, e^{-(-1+\operatorname{arccsch}(x))^2}}{\sqrt{x^2+1}}\, dx\right)^2$$

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

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

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

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

"i is", 15,

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

$$g := t \to \operatorname{arccsch}(t+1)$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[\left[y\sim \to -\frac{2\,(\sinh(y\sim)-1)\,e^{-\frac{(\sinh(y\sim)-1)^2}{\sinh(y\sim)^2}}\cosh(y\sim)}{\sinh(y\sim)^3}\right], \left[0, \ln\left(1+\sqrt{2}\right)\right], \right.\right.$$
$$\left.\left[\text{"Continuous"}, \text{"PDF"}\right]\right]$$
$$\text{"l and u"}, 0, \infty$$
$$\text{"g(x)"}, \operatorname{arccsch}(x+1), \text{"base"}, 2\,x\,e^{-x^2}, \text{"WeibullRV(1,2)"}$$
$$\text{"f(x)"}, -\frac{2\,(\sinh(x)-1)\,e^{-\frac{(\sinh(x)-1)^2}{\sinh(x)^2}}\cosh(x)}{\sinh(x)^3}$$
$$\text{"F(x)"}, e^{-\frac{e^{4x}-4e^{3x}+2e^{2x}+4e^{x}+1}{e^{4x}-2e^{2x}+1}}$$
$$\text{"IDF(x)"}, \left[\left[\ln@\left(s \to \mathit{RootOf}\left((1+\ln(s))\,\_Z^4-4\,\_Z^3+(-2\ln(s)+2)\,\_Z^2+4\,\_Z+1 \right.\right.\right.\right.$$
$$\left.\left.\left.\left. +\ln(s)\right)\right)\right], [0, 1], [\text{"Continuous"}, \text{"IDF"}]\right]$$
$$\text{"S(x)"}, 1-e^{\frac{-e^{4x}+4e^{3x}-2e^{2x}-4e^{x}-1}{e^{4x}-2e^{2x}+1}}$$
$$\text{"h(x)"}, \frac{2\,(\sinh(x)-1)\,e^{-\frac{(\sinh(x)-1)^2}{\sinh(x)^2}}\cosh(x)}{\sinh(x)^3\left(-1+e^{-\frac{e^{4x}-4e^{3x}+2e^{2x}+4e^{x}+1}{e^{4x}-2e^{2x}+1}}\right)}$$
$$\text{"mean and variance"}, -2\left(\int_0^{\ln\left(1+\sqrt{2}\right)} \frac{e^{\frac{-\cosh(x)^2+2\sinh(x)}{\sinh(x)^2}}\cosh(x)\,(\sinh(x)-1)\,x}{\sinh(x)^3}\,dx\right), -2\left(\right.$$
$$\left.\int_0^{\ln\left(1+\sqrt{2}\right)} \frac{e^{\frac{-\cosh(x)^2+2\sinh(x)}{\sinh(x)^2}}\cosh(x)\,(\sinh(x)-1)\,x^2}{\sinh(x)^3}\,dx\right)$$
$$-4\left(\int_0^{\ln\left(1+\sqrt{2}\right)} \frac{e^{\frac{-\cosh(x)^2+2\sinh(x)}{\sinh(x)^2}}\cosh(x)\,(\sinh(x)-1)\,x}{\sinh(x)^3}\,dx\right)^2$$

$$mf := \int_{0}^{\ln\left(1+\sqrt{2}\right)} \left(- \frac{2\, x^{r\sim} \left(\sinh(x) - 1\right) \mathrm{e}^{-\frac{(\sinh(x)-1)^2}{\sinh(x)^2}} \cosh(x)}{\sinh(x)^3} \right) \mathrm{d}x$$

$$\text{"MF"}, \int_{0}^{\ln\left(1+\sqrt{2}\right)} \left(- \frac{2\, x^{r\sim} \left(\sinh(x) - 1\right) \mathrm{e}^{-\frac{(\sinh(x)-1)^2}{\sinh(x)^2}} \cosh(x)}{\sinh(x)^3} \right) \mathrm{d}x$$

$$\text{"MGF"}, -2 \left(\int_{0}^{\ln\left(1+\sqrt{2}\right)} \frac{\mathrm{e}^{\frac{\cosh(x)^2 t x - \cosh(x)^2 - t x + 2 \sinh(x)}{\sinh(x)^2}} \cosh(x) \left(\sinh(x) - 1\right)}{\sinh(x)^3} \mathrm{d}x \right)$$

```
-2\,{\frac { \left( \sinh \left( x \right) -1 \right) \cosh
\left( x
 \right) }{ \left( \sinh \left( x \right)  \right) ^{3}}{{\rm e}
^{-{
\frac { \left( \sinh \left( x \right) -1 \right) ^{2}}{ \left(
\sinh
 \left( x \right)  \right) ^{2}}}}}}
```

"i is", 16,

" --"

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

$$l := 0$$

$$u := \infty$$

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

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

"l and u", 0, ∞

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

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

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

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

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

$$\text{"h(x)"}, -\left(2\,e^{-\left(-1+\operatorname{arctanh}\left(\frac{1}{x}\right)\right)^2}\left(-1+\operatorname{arctanh}\left(\frac{1}{x}\right)\right)\right)\Bigg/\left(\left((x-1)^{\frac{1}{2}\ln(x+1)} e^{-\frac{1}{4}\ln(x+1)^2-\frac{1}{4}\ln(x-1)^2-1}x+(x-1)^{\frac{1}{2}\ln(x+1)} e^{-\frac{1}{4}\ln(x+1)^2-\frac{1}{4}\ln(x-1)^2-1}-x+1\right)(x+1)\right)$$

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

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

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

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

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

"i is", 17,

" ---"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

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

"IDF(x)", [[ ], [0, 1], ["Continuous", "IDF"]]

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

$$+1\Big)^{2\ln(x)} e^{-1-\ln\left(\sqrt{x^2+1}+1\right)^2-\ln(x)^2} + 2\left(\sqrt{x^2+1}\right.$$

$$\left.+1\Big)^{2\ln(x)} e^{-1-\ln\left(\sqrt{x^2+1}+1\right)^2-\ln(x)^2} - x^2\right)$$

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

$$\left(\sqrt{x^2+1}\,|x|\,\left(x^{2\ln\left(\sqrt{x^2+1}+1\right)}+2\,e^{-1-\ln\left(\sqrt{x^2+1}+1\right)^2-\ln(x)^2}\right.\right.$$

$$+2\sqrt{x^2+1}\,x^{2\ln\left(\sqrt{x^2+1}+1\right)} e^{-1-\ln\left(\sqrt{x^2+1}+1\right)^2-\ln(x)^2}$$

$$\left.\left.+2\,x^{2\ln\left(\sqrt{x^2+1}+1\right)} e^{-1-\ln\left(\sqrt{x^2+1}+1\right)^2-\ln(x)^2} - x^2\right)\right)$$

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

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

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

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

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

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

```
2\,{\frac { \left( -1+{\rm arcsinh} \left({x}^{-1}\right)
\right) {
{\rm e}^{- \left( -1+{\rm arcsinh} \left({x}^{-1}\right) \right)
^{2}}
}}{\sqrt {{x}^{2}+1} \left| x \right| }}
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"i is", 18,

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

$$l := 0$$

$$u := \infty$$

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

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

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

$$"g(x)", \frac{1}{\operatorname{arcsinh}(x+1)}, "base", 2\, x\, e^{-x^2}, "WeibullRV(1,2)"$$

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

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

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

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

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

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

"Mean and Variance did not work"

$$mf := \int_{0}^{\frac{1}{\ln\left(1+\sqrt{2}\right)}} \frac{2\,x^{r\sim}\left(-1+\sinh\left(\frac{1}{x}\right)\right)\mathrm{e}^{-\left(-1+\sinh\left(\frac{1}{x}\right)\right)^{2}}\cosh\left(\frac{1}{x}\right)}{x^{2}}\,\mathrm{d}x$$

$$\text{"MF"},\ \int_{0}^{\frac{1}{\ln\left(1+\sqrt{2}\right)}} \frac{2\,x^{r\sim}\left(-1+\sinh\left(\frac{1}{x}\right)\right)\mathrm{e}^{-\left(-1+\sinh\left(\frac{1}{x}\right)\right)^{2}}\cosh\left(\frac{1}{x}\right)}{x^{2}}\,\mathrm{d}x$$

"MGF didn't work"

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

"i is", 19,

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

$$\text{"g(x)"},\ \frac{1}{\operatorname{csch}(x)}+1,\ \text{"base"},\ 2\,x\,\mathrm{e}^{-x^{2}},\ \text{"WeibullRV(1,2)"}$$

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

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

"IDF did not work"

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

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

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

$$\int_{1}^{\infty}\frac{2x^{2}\operatorname{arccsch}\left(\frac{1}{x-1}\right)\mathrm{e}^{-\operatorname{arccsch}\left(\frac{1}{x-1}\right)^{2}}}{\sqrt{x^{2}-2x+2}}\,\mathrm{d}x$$

$$-\left(\int_{1}^{\infty}\frac{2x\operatorname{arccsch}\left(\frac{1}{x-1}\right)\mathrm{e}^{-\operatorname{arccsch}\left(\frac{1}{x-1}\right)^{2}}}{\sqrt{x^{2}-2x+2}}\,\mathrm{d}x\right)^{2}$$

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

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

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

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

"i is", 20,

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow -\frac{2\, e^{-\frac{1}{\operatorname{arctanh}(y\sim)^{2}}}}{\operatorname{arctanh}(y\sim)^{3}\,(y\sim^{2}-1)}\right], [0, 1], ["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

$$"g(x)", \tanh\left(\frac{1}{x}\right), "base", 2\, x\, e^{-x^{2}}, "WeibullRV(1,2)"$$

$$"f(x)", -\frac{2\, e^{-\frac{1}{\operatorname{arctanh}(x)^{2}}}}{\operatorname{arctanh}(x)^{3}\,(x^{2}-1)}$$

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

$$\text{"mean and variance"}, -2 \left(\int_0^1 \frac{x\, e^{-\frac{1}{\operatorname{arctanh}(x)^2}}}{\operatorname{arctanh}(x)^3 \left(x^2-1\right)}\, dx\right), -2 \left(\int_0^1 \frac{x^2\, e^{-\frac{1}{\operatorname{arctanh}(x)^2}}}{\operatorname{arctanh}(x)^3 \left(x^2-1\right)}\, dx\right)$$

$$-4 \left(\int_0^1 \frac{x\, e^{-\frac{1}{\operatorname{arctanh}(x)^2}}}{\operatorname{arctanh}(x)^3 \left(x^2-1\right)}\, dx\right)^2$$

$$mf := \int_0^1 \left(-\frac{2\, x^{r\sim}\, e^{-\frac{1}{\operatorname{arctanh}(x)^2}}}{\operatorname{arctanh}(x)^3 \left(x^2-1\right)}\right) dx$$

$$\text{"MF"}, \int_0^1 \left(-\frac{2\, x^{r\sim}\, e^{-\frac{1}{\operatorname{arctanh}(x)^2}}}{\operatorname{arctanh}(x)^3 \left(x^2-1\right)}\right) dx$$

$$\text{"MGF"}, -2 \left(\int_0^1 \frac{e^{\frac{t\, x \operatorname{arctanh}(x)^2 - 1}{\operatorname{arctanh}(x)^2}}}{\operatorname{arctanh}(x)^3 \left(x^2-1\right)}\, dx\right)$$

```
-2\,{\frac {1}{ \left( {\rm arctanh} \left(x\right) \right) ^{3}
 \left( {x}^{2}-1 \right) }{{\rm e}^{- \left( {\rm arctanh}
\left(x
\right) \right) ^{-2}}}}
```

"i is", 21,

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{2\, e^{-\frac{1}{\operatorname{arccsch}(y\sim)^2}}}{\sqrt{y\sim^2+1}\, \operatorname{arccsch}(y\sim)^3\, |y\sim|}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

$$\text{"g(x)"}, \operatorname{csch}\left(\frac{1}{x}\right), \text{"base"}, 2\, x\, e^{-x^2}, \text{"WeibullRV(1,2)"}$$

$$\text{"f(x)"}, \frac{2\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3\,|x|}$$

$$\text{"F(x)"}, 2\left(\int_0^x \frac{\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(t)^2}}}{\sqrt{t^2+1}\,\operatorname{arccsch}(t)^3\,|t|}\,\mathrm{d}t\right)$$

"IDF did not work"

$$\text{"S(x)"}, 1-2\left(\int_0^x \frac{\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(t)^2}}}{\sqrt{t^2+1}\,\operatorname{arccsch}(t)^3\,|t|}\,\mathrm{d}t\right)$$

$$\text{"h(x)"}, -\frac{2\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3\,|x|\left(-1+2\left(\int_0^x \frac{\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(t)^2}}}{\sqrt{t^2+1}\,\operatorname{arccsch}(t)^3\,|t|}\,\mathrm{d}t\right)\right)}$$

$$\text{"mean and variance"}, \int_0^\infty \frac{2\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3}\,\mathrm{d}x, \int_0^\infty \frac{2\,x\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3}\,\mathrm{d}x$$

$$-\left(\int_0^\infty \frac{2\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3}\,\mathrm{d}x\right)^2$$

$$mf := \int_0^\infty \frac{2\,x^{r\sim}\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3\,|x|}\,\mathrm{d}x$$

$$\text{"MF"}, \int_0^\infty \frac{2\,x^{r\sim}\,\mathrm{e}^{-\frac{1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3\,|x|}\,\mathrm{d}x$$

$$\text{"MGF"}, \int_0^\infty \frac{2\,\mathrm{e}^{\frac{t\,x\,\operatorname{arccsch}(x)^2-1}{\operatorname{arccsch}(x)^2}}}{\sqrt{x^2+1}\,\operatorname{arccsch}(x)^3\,x}\,\mathrm{d}x$$

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

```
(x\right)
 \right) ^{3} \left| x \right| }{{\rm e}^{- \left( {\rm arccsch}
\left(x\right) \right) ^{-2}}}}
```
"i is", 22,
"---"

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to 2\,\mathrm{e}^{-\sinh(y\sim)^2}\cosh(y\sim)\sinh(y\sim)\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

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

$$\text{"g(x)"}, \operatorname{arccsch}\left(\frac{1}{x}\right), \text{"base"}, 2\,x\,\mathrm{e}^{-x^2}, \text{"WeibullRV(1,2)"}$$

$$\text{"f(x)"}, 2\,\mathrm{e}^{-\sinh(x)^2}\cosh(x)\sinh(x)$$

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

ERROR(IDF): Could not find the appropriate inverse

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

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

$$\text{"h(x)"}, 2\sinh(x)\,\mathrm{e}^{-\cosh(x)^2+\frac{1}{2}+\frac{1}{4}\mathrm{e}^{-2x}+\frac{1}{4}\mathrm{e}^{2x}}\cosh(x)$$

$$\text{"mean and variance"}, \int_0^\infty \mathrm{e}^{\frac{1}{2}-\frac{1}{2}\cosh(2x)}\,x\sinh(2x)\,\mathrm{d}x, \int_0^\infty \mathrm{e}^{\frac{1}{2}-\frac{1}{2}\cosh(2x)}\,x^2\sinh(2x)\,\mathrm{d}x - \left(\int_0^\infty \mathrm{e}^{\frac{1}{2}-\frac{1}{2}\cosh(2x)}\,x\sinh(2x)\,\mathrm{d}x\right)^2$$

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

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

$$\text{"MGF"}, \int_0^\infty \mathrm{e}^{t\,x+\frac{1}{2}-\frac{1}{2}\cosh(2x)}\sinh(2x)\,\mathrm{d}x$$

```
2\,{{\rm e}^{- \left( \sinh \left( x \right)  \right) ^{2}}}
\cosh
 \left( x \right) \sinh \left( x \right)
```