```
> 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 := ArcSinRV();
  bfname := "ArcSinRV()";
```

$$bf := \left[\left[x \rightarrow \frac{1}{\pi \sqrt{x\,(1-x)}} \right], [0, 1], [\text{"Continuous"}, \text{"PDF"}] \right]$$

$$bfname := \text{"ArcSinRV()"} \tag{1}$$

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

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

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

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

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

"i is", 1,

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

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

$$l := 0$$

$$u := \infty$$

$$\mathit{Temp} := \left[\left[y\text{\textasciitilde} \rightarrow e^{-y\text{\textasciitilde}}\right], [0, \infty], [\text{"Continuous"}, \text{"PDF"}]\right]$$

"l and u", 0, ∞

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

"f(x)", e^{-x}

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

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

"S(x)", e^{-x}

"h(x)", 1

"mean and variance", 1, 1

$$mf := \Gamma(r\sim + 1)$$

"MF", $\Gamma(r\sim + 1)$

"MGF", $\lim_{x \rightarrow \infty} \dfrac{e^{x(t-1)} - 1}{t - 1}$

```
{{\rm e}^{-x}}
```
"i is", 2,
```
    " -----------------------------------------------------------------------------------------------
    ----------"
```

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow 4\, y\sim^3\, e^{-y\sim^4}\right], [0, \infty], ["Continuous", "PDF"]\right]$$

"l and u", 0, ∞

"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)", $\left[\left[s \rightarrow (-\ln(1-s))^{1/4}\right], [0, 1], ["Continuous", "IDF"]\right]$

"S(x)", e^{-x^4}

"h(x)", $4\, x^3$

"mean and variance", $\dfrac{1}{4} \dfrac{\pi\sqrt{2}}{\Gamma\left(\frac{3}{4}\right)}$, $\dfrac{1}{2}\sqrt{\pi} - \dfrac{1}{8} \dfrac{\pi^2}{\Gamma\left(\frac{3}{4}\right)^2}$

$$mf := \Gamma\left(\dfrac{1}{4}\, r\sim + 1\right)$$

"MF", $\Gamma\left(\dfrac{1}{4}\, r\sim + 1\right)$

"MGF", $\dfrac{1}{8} \dfrac{1}{\Gamma\left(\frac{3}{4}\right)\sqrt{\pi}} \left(\Gamma\left(\dfrac{3}{4}\right)^2 \text{hypergeom}\left([\ ], \left[\dfrac{5}{4}, \dfrac{3}{2}\right], \dfrac{1}{256}\, t^4\right) t^3 \sqrt{\pi}\right.$

$\left. + 2\, \pi^{3/2}\sqrt{2}\, \text{hypergeom}\left([\ ], \left[\dfrac{1}{2}, \dfrac{3}{4}\right], \dfrac{1}{256}\, t^4\right) t + 2\, \pi\, \Gamma\left(\dfrac{3}{4}\right) \text{hypergeom}\left([\ ], \left[\dfrac{3}{4},\right.\right.\right.$

$\left.\left.\left. \dfrac{5}{4}\right], \dfrac{1}{256}\, t^4\right) t^2 + 8\, \Gamma\left(\dfrac{3}{4}\right) \text{hypergeom}\left([1], \left[\dfrac{1}{4}, \dfrac{1}{2}, \dfrac{3}{4}\right], \dfrac{1}{256}\, t^4\right) \sqrt{\pi}\right)$

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

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

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

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

$$\text{"i is"}, 4,$$

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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,

" --

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

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

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

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

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

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

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

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

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

"MGF", $\displaystyle\int_1^\infty \frac{2 \ln(x) \ e^{tx - \ln(x)^2}}{x} \ dx$

```
2\,{\frac {\ln  \left( x \right) {{\rm e}^{- \left( \ln  \left(
x
 \right)  \right) ^{2}}}}{x}}
```
"i is", 6,

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

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

```
2\,{{\rm e}^{2\,x-{{\rm e}^{2\,x}}}}}}
```
"i is", 7,

" --

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

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

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

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

```
-2\,{\frac {\ln  \left( x \right) {{\rm e}^{- \left( \ln  \left(
x
 \right)  \right) ^{2}}}}{x}}
```
"i is", 8,

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

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

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

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

$$\text{"i is"}, 9,$$

$$\text{" --}$$
$$\text{----------"}$$

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\text{"i is"}, 10,$$

$$\text{" --}$$
$$\text{----------"}$$

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

$$l := 0$$

$$u := \infty$$

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

$$\left.\left.\text{"PDF"}\right]\right]$$

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

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

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

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

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

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

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

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

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

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

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

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

```
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,

" --
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$$g := t \rightarrow \tanh(t)$$
$$l := 0$$
$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

"i is", 12,

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

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

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

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

```
2\,{\frac {{\rm arcsinh} \left(x\right){{\rm e}^{- \left(
{\rm arcsinh} \left(x\right) \right) ^{2}}}}{\sqrt {{x}^{2}+1}}}
```
"i is", 13,

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$$g := t \rightarrow \text{arcsinh}(t)$$
$$l := 0$$
$$u := \infty$$

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

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

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

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

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

$$-\left(\int_0^\infty e^{\frac{1}{2} - \frac{1}{2}\cosh(2x)}\, x\sinh(2x)\, dx\right)^2$$

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

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

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

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

$$\text{"i is", } 14,$$

$$\text{" ---}$$
$$\text{---------"}$$

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

$$l := 0$$

$$u := \infty$$

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

$$\left. \text{"PDF"}\right]$$

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

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

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

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

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

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

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

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

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

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

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

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

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

```
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,

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \rightarrow -\frac{2\,(\sinh(y\sim) - 1)\,e^{-\frac{(\sinh(y\sim) - 1)^2}{\sinh(y\sim)^2}}\cosh(y\sim)}{\sinh(y\sim)^3}\right], \left[0, \ln\left(1 + \sqrt{2}\right)\right],\right.$$

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

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

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

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

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

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

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

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

$$"\text{mean and variance}", -2\left(\int_0^{\ln\left(1 + \sqrt{2}\right)} \frac{e^{\frac{-\cosh(x)^2 + 2\sinh(x)}{\sinh(x)^2}}\cosh(x)\,(\sinh(x) - 1)\,x}{\sinh(x)^3}\,dx\right), -2\left(\right.$$

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

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

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

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

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

```
-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,

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    " ----------------------------------------------------------------------------------------------
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```

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

$\left.\text{"IDF"}\right]\right]$

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

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

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

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

$\left.\left.+1\right)(x+1)\right)$

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

$\int_1^{\frac{e^2+1}{e^2-1}} \frac{x^2\left(-1+\text{arctanh}\left(\frac{1}{x}\right)\right) e^{-\left(-1+\text{arctanh}\left(\frac{1}{x}\right)\right)^2}}{x^2-1} dx\Bigg)$

$-4\left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x\left(-1+\text{arctanh}\left(\frac{1}{x}\right)\right) e^{-\left(-1+\text{arctanh}\left(\frac{1}{x}\right)\right)^2}}{x^2-1} dx\right)^2$

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

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

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

```
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,

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\mathit{mf}:=\int_0^{\frac{2}{\mathrm{e}-\mathrm{e}^{-1}}}\frac{2\,x^{\prime\sim}\left(-1+\mathrm{arcsinh}\left(\frac{1}{x}\right)\right)\mathrm{e}^{-\left(-1+\mathrm{arcsinh}\left(\frac{1}{x}\right)\right)^2}}{\sqrt{x^2+1}\,|x|}\,\mathrm{d}x$$

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

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

"Mean and Variance did not work"

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

$$\text{"MF"},\; \int_0^{\frac{1}{\ln\left(1+\sqrt{2}\right)}} \frac{2\,x^{\prime\sim}\left(-1+\sinh\left(\frac{1}{x}\right)\right)e^{-\left(-1+\sinh\left(\frac{1}{x}\right)\right)^2}\cosh\left(\frac{1}{x}\right)}{x^2}\,dx$$

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

$$mf:=\int_{1}^{\infty}\frac{2x^{\tilde{}}\,\operatorname{arccsch}\!\left(\dfrac{1}{x-1}\right)\,e^{-\operatorname{arccsch}\left(\frac{1}{x-1}\right)^{2}}}{\sqrt{x^{2}-2x+2}}\,dx$$

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

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

```
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}}}
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"i is", 20,
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$$g := t \rightarrow \tanh\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

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

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

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

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

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

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

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

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

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