

```
> restart;
read("c:/appl/app17.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 := GeneralizedParetoRV(2,3,4);`
`bfname := "GeneralizedParetoRV(2,3,4)";`

$$bf := \left[x \rightarrow \frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}, [0, \infty], ["Continuous", "PDF"] \right]$$

`bfname := "GeneralizedParetoRV(2,3,4)"` (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);`

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

`> # discarded -ln(t + 1), t-> csch(t), t->arccsch(t), t -> tan(t),`
`> #name of the file for latex output`
`filename := "C:/LatexOutput/GeneralizedPareto.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 <> 4 and i <> 14 and i <> 17 and i <> 18 and i <> 19 and i
<> 20 and i <> 21 then
  print("IDF(x)", IDF(Temp));
end if;
print("S(x)", SF(Temp, x));
print("h(x)", HF(Temp, x));
if i <> 19 then
  print("mean and variance", Mean(Temp), Variance(Temp));
  assume(r > 0); mf := int(x^r*PDF(Temp, x), x = Temp[2][1] ...
Temp[2][2]);
  print("MF", mf);
  print("MGF", MGF(Temp));
  if i <> 21 then
    PlotDist(PDF(Temp), 0, 40);
    PlotDist(HF(Temp), 0, 40);
  end if;
  latex(PDF(Temp,x));
#print("transforming with", [[x->g(x)], [0,infinity]]);
#X2 := Transform(bf, [[x->g(x)], [0,infinity]]);
#print("pdf of X2 = ", PDF(X2,x));
#print("pdf of Temp = ", PDF(Temp,x));
end if;

#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 <> 4 and i <> 14 and i <> 17 and i <> 18 and i <> 19 and i
<> 20 and i <> 21 then
  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("$$");
if i <> 19 then
  printf("Mean \n $$ \mu=");
  latex(Mean(Temp));
  printf("$$ Variance \n $$ \sigma^2 = ");
  latex(Variance(Temp));
  printf("$$");
  printf("Moment Function \n $$ m(x) = ");
  latex(mf);
  printf("$$ Moment Generating Function \n $$");
  latex(MGF(Temp)[1]);
  printf("$$");
end if;
#latex(MGF(Temp)[1]);

writeto(terminal);

od;

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

```

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

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

"i is", 1,

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

$$\begin{aligned} g &:= t \rightarrow t^2 \\ l &:= 0 \\ u &:= \infty \end{aligned}$$

$$\begin{aligned}
Temp := & \left[\left[y \sim \rightarrow \frac{81 (\sqrt{y} + 5) e^{-2\sqrt{y}}}{(\sqrt{y} + 3)^5 \sqrt{y}} \right], [0, \infty], ["Continuous", "PDF"] \right] \\
& "l and u", 0, \infty \\
& "g(x)", x^2, "base", \frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}, "GeneralizedParetoRV(2,3,4)" \\
& "f(x)", \frac{81 (\sqrt{x} + 5) e^{-2\sqrt{x}}}{(\sqrt{x} + 3)^5 \sqrt{x}} \\
& "F(x)", -\frac{-12x^{3/2} - x^2 + 81 e^{-2\sqrt{x}} - 108\sqrt{x} - 54x - 81}{x^2 + 12x^{3/2} + 54x + 108\sqrt{x} + 81} \\
& "IDF(x)", [[], [0, 1], ["Continuous", "IDF"]] \\
& "S(x)", \frac{81 e^{-2\sqrt{x}}}{x^2 + 12x^{3/2} + 54x + 108\sqrt{x} + 81} \\
& "h(x)", \frac{(\sqrt{x} + 5) (x^2 + 12x^{3/2} + 54x + 108\sqrt{x} + 81)}{(\sqrt{x} + 3)^5 \sqrt{x}} \\
& "mean and variance", -141 + 972 e^6 \text{Ei}(1, 6), -944784 \text{Ei}(1, 6)^2 e^{12} + 309420 e^6 \text{Ei}(1, 6) \\
& - 25011 \\
& "MF", 2^{-2-2r} \left(-19008 \Gamma(2r-3) r - 82080 \Gamma(2r-3) r^2 - 27648 \Gamma(2r-3) r^3 \right. \\
& \left. - 3456 \Gamma(2r-3) r^4 + 324000 \Gamma(2r-3) \right. \\
& \left. - \frac{2^{3+2r} 3^{1+2r} \left(90 + \frac{529}{6} r + \frac{215}{6} r^2 + \frac{22}{3} r^3 + \frac{2}{3} r^4 \right) e^6 \pi}{\sin(2\pi r)} \right. \\
& \left. + 2^{3+2r} 3^{1+2r} \left(\frac{4}{3} r^5 + \frac{38}{3} r^4 - 270 + \frac{149}{3} r^3 - \frac{169}{2} r^2 + \frac{413}{6} r^1 \right) e^6 \Gamma(3 \right. \\
& \left. - 2r, 6) \Gamma(2r-3) + \frac{1}{\sin(2\pi r)} (2^{2r-1} \pi^2 3^{2r} (32r^5 + 448r^4 \right. \\
& \left. + 2776r^3 + 9392r^2 + 17016r + 12960) \text{LaguerreL}(-2r, 2r, 6) \csc(2\pi r) \right) \\
& - \frac{1}{\sin(2\pi r)} (2^{3+2r} \pi^2 2^{2r} (16r^4 + 176r^3 + 860r^2 + 2116r
\end{aligned}$$

$$\begin{aligned}
& + 2160) \operatorname{LaguerreL}(-2 r\sim, 1 + 2 r\sim, 6) \csc(2 \pi r\sim) \Big) \Big) + 5 2^{-1 - 2 r\sim} \left(44064 \Gamma(-4 \right. \\
& \left. + 2 r\sim) r\sim - 45792 \Gamma(-4 + 2 r\sim) r\sim^2 - 20736 \Gamma(-4 + 2 r\sim) r\sim^3 - 3456 \Gamma(-4 \right. \\
& \left. + 2 r\sim) r\sim^4 + 316224 \Gamma(-4 + 2 r\sim) \right. \\
& \left. + \frac{2^{2 r\sim + 2} 3^{2 r\sim} \left(54 + \frac{115}{2} r\sim + \frac{155}{6} r\sim^2 + 6 r\sim^3 + \frac{2}{3} r\sim^4 \right) e^6 \pi}{\sin(2 \pi r\sim)} \right. \\
& \left. + 2^{2 r\sim + 2} 3^{2 r\sim} \left(\frac{4}{3} r\sim^5 + \frac{28}{3} r\sim^4 - 216 + \frac{83}{3} r\sim^3 - 122 r\sim + \frac{35}{3} r\sim^2 \right) e^6 \Gamma(4 - 2 r\sim, \right. \\
& \left. 6) \Gamma(-4 + 2 r\sim) - \frac{1}{\sin(2 \pi r\sim)} \left(2 2^{-2 + 2 r\sim} 3^{2 r\sim - 1} \pi^2 (32 r\sim^5 + 384 r\sim^4 + 2104 r\sim^3 \right. \\
& \left. + 6480 r\sim^2 + 10872 r\sim + 7776) \operatorname{LaguerreL}(-2 r\sim, 2 r\sim, 6) \csc(2 \pi r\sim) \right) \right. \\
& \left. + \frac{1}{\sin(2 \pi r\sim)} \left(2 2^{2 r\sim - 1} \pi^2 3^{2 r\sim} (16 r\sim^4 + 144 r\sim^3 + 620 r\sim^2 + 1380 r\sim \right. \right. \\
& \left. \left. + 1296) \operatorname{LaguerreL}(-2 r\sim, 1 + 2 r\sim, 6) \csc(2 \pi r\sim) \right) \right) \\
& \text{"MGF", } \int_0^{\infty} \frac{81 (\sqrt{x} + 5) e^{tx - 2\sqrt{x}}}{(\sqrt{x} + 3)^5 \sqrt{x}} dx \\
& 81 \frac{\sqrt{x} + 5}{(\sqrt{x} + 3)^5} e^{tx - 2\sqrt{x}} \\
& \frac{\partial}{\partial x} \left(\frac{81 (\sqrt{x} + 5) e^{tx - 2\sqrt{x}}}{(\sqrt{x} + 3)^5 \sqrt{x}} \right) \\
& "i is", 2, \\
& " \text{-----}" \\
& " \text{-----}" \\
& \begin{aligned} g &:= t \rightarrow \sqrt{t} \\ l &:= 0 \\ u &:= \infty \end{aligned} \\
& \text{Temp} := \left[\left[y\sim \rightarrow \frac{324 (y\sim^2 + 5) e^{-2 y\sim^2} y\sim}{(y\sim^2 + 3)^5} \right], [0, \infty], ["Continuous", "PDF"] \right] \\
& "l and u", 0, \infty
\end{aligned}$$

$$\begin{aligned}
& "g(x)", \sqrt{x}, "base", \frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}, "GeneralizedParetoRV(2,3,4)" \\
& "f(x)", \frac{324 (x^2 + 5) e^{-2x^2} x}{(x^2 + 3)^5} \\
& "F(x)", -\frac{-x^8 - 12 x^6 - 54 x^4 - 108 x^2 + 81 e^{-2x^2} - 81}{(x^2 + 3)^4} \\
& "IDF(x)", [[], [0, 1], ["Continuous", "IDF"]] \\
& "S(x)", \frac{81 e^{-2x^2}}{(x^2 + 3)^4} \\
& "h(x)", \frac{4 (x^2 + 5) x}{x^2 + 3} \\
& "mean and variance", \frac{463}{32} \sqrt{3} \pi e^6 \operatorname{erf}(\sqrt{2} \sqrt{3}) - \frac{463}{32} \sqrt{3} \pi e^6 + \frac{111}{16} \sqrt{2} \sqrt{\pi}, \\
& -108 e^6 \operatorname{Ei}(1, 6) + 16 - \frac{643107}{1024} \pi^2 e^{12} \operatorname{erf}(\sqrt{2} \sqrt{3})^2 + \frac{643107}{512} \pi^2 e^{12} \operatorname{erf}(\sqrt{2} \sqrt{3}) \\
& - \frac{51393}{256} \sqrt{3} \pi^{3/2} e^6 \operatorname{erf}(\sqrt{2} \sqrt{3}) \sqrt{2} - \frac{643107}{1024} \pi^2 e^{12} + \frac{51393}{256} \sqrt{3} \pi^{3/2} e^6 \sqrt{2} \\
& - \frac{12321}{128} \pi \\
& "MF", \frac{1}{9} \sqrt{3} 2^{-\frac{7}{2} - \frac{1}{2} r\sim} \left(-28512 \sqrt{6} r\sim \Gamma\left(-3 + \frac{1}{2} r\sim\right) - 30780 \sqrt{6} r\sim^2 \Gamma\left(-3 + \frac{1}{2} r\sim\right) \right. \\
& \left. - 2592 \sqrt{6} r\sim^3 \Gamma\left(-3 + \frac{1}{2} r\sim\right) - 81 \sqrt{6} r\sim^4 \Gamma\left(-3 + \frac{1}{2} r\sim\right) + 1944000 \sqrt{6} \Gamma\left(-3 + \frac{1}{2} r\sim\right) \right. \\
& \left. + \frac{1}{2} r\sim \right) \\
& - \frac{2^{\frac{9}{2} + \frac{1}{2} r\sim} 3^{\frac{5}{2} + \frac{1}{2} r\sim} \left(90 + \frac{529}{24} r\sim + \frac{215}{96} r\sim^2 + \frac{11}{96} r\sim^3 + \frac{1}{384} r\sim^4 \right) e^6 \pi}{\sin\left(\frac{1}{2} \pi r\sim\right)}
\end{aligned}$$

$$\begin{aligned}
& + 2^{\frac{9}{2} + \frac{1}{2} r\sim} 3^{\frac{5}{2} + \frac{1}{2} r\sim} \left(-270 + \frac{413}{96} r\sim^2 - \frac{169}{8} r\sim + \frac{149}{192} r\sim^3 + \frac{19}{384} r\sim^4 \right. \\
& \left. + \frac{1}{768} r\sim^5 \right) e^6 \Gamma\left(3 - \frac{1}{2} r\sim, 6\right) \Gamma\left(-3 + \frac{1}{2} r\sim\right) \\
& + \frac{1}{2} \frac{1}{\sin\left(\frac{1}{2} \pi r\sim\right)} \left(3^{\frac{3}{2} + \frac{1}{2} r\sim} 2^{-\frac{5}{2} + \frac{1}{2} r\sim} \pi^2 (r\sim^5 + 56 r\sim^4 + 1388 r\sim^3 + 18784 r\sim^2 \right. \\
& \left. + 136128 r\sim + 414720) \operatorname{LaguerreL}\left(-\frac{1}{2} r\sim, \frac{1}{2} r\sim, 6\right) \csc\left(\frac{1}{2} \pi r\sim\right) \right) \\
& - \frac{1}{2} \frac{1}{\sin\left(\frac{1}{2} \pi r\sim\right)} \left(3^{\frac{5}{2} + \frac{1}{2} r\sim} 2^{\frac{1}{2} r\sim - \frac{1}{2}} \pi^2 (r\sim^4 + 44 r\sim^3 + 860 r\sim^2 + 8464 r\sim \right. \\
& \left. + 34560) \operatorname{LaguerreL}\left(-\frac{1}{2} r\sim, 1 + \frac{1}{2} r\sim, 6\right) \csc\left(\frac{1}{2} \pi r\sim\right) \right) \\
& + \frac{5}{9} \sqrt{3} 2^{-\frac{5}{2} - \frac{1}{2} r\sim} \left(66096 \sqrt{6} r\sim \Gamma\left(-4 + \frac{1}{2} r\sim\right) - 17172 \sqrt{6} r\sim^2 \Gamma\left(-4 + \frac{1}{2} r\sim\right) \right. \\
& \left. - 1944 \sqrt{6} r\sim^3 \Gamma\left(-4 + \frac{1}{2} r\sim\right) - 81 \sqrt{6} r\sim^4 \Gamma\left(-4 + \frac{1}{2} r\sim\right) + 1897344 \sqrt{6} \Gamma\left(-4 \right. \right. \\
& \left. \left. + \frac{1}{2} r\sim\right) \right) \\
& + \frac{2^{\frac{7}{2} + \frac{1}{2} r\sim} 3^{\frac{3}{2} + \frac{1}{2} r\sim} \left(54 + \frac{115}{8} r\sim + \frac{155}{96} r\sim^2 + \frac{3}{32} r\sim^3 + \frac{1}{384} r\sim^4 \right) e^6 \pi}{\sin\left(\frac{1}{2} \pi r\sim\right)}
\end{aligned}$$

$$\begin{aligned}
& + 2^{\frac{7}{2}} + \frac{1}{2} r^{\sim} 3^{\frac{3}{2}} + \frac{1}{2} r^{\sim} \left(-216 + \frac{35}{48} r^{\sim 2} - \frac{61}{2} r^{\sim} + \frac{83}{192} r^{\sim 3} + \frac{7}{192} r^{\sim 4} \right. \\
& \left. + \frac{1}{768} r^{\sim 5} \right) e^6 \Gamma\left(4 - \frac{1}{2} r^{\sim}, 6\right) \Gamma\left(-4 + \frac{1}{2} r^{\sim}\right) \\
& - \frac{1}{2} \frac{1}{\sin\left(\frac{1}{2} \pi r^{\sim}\right)} \left(2^{-\frac{7}{2} + \frac{1}{2} r^{\sim}} \pi^2 3^{\frac{1}{2} r^{\sim} + \frac{1}{2}} (r^{\sim 5} + 48 r^{\sim 4} + 1052 r^{\sim 3} + 12960 r^{\sim 2} \right. \\
& \left. + 86976 r^{\sim} + 248832) \operatorname{LaguerreL}\left(-\frac{1}{2} r^{\sim}, \frac{1}{2} r^{\sim}, 6\right) \csc\left(\frac{1}{2} \pi r^{\sim}\right) \right) \\
& + \frac{1}{2} \frac{1}{\sin\left(\frac{1}{2} \pi r^{\sim}\right)} \left(3^{\frac{3}{2} + \frac{1}{2} r^{\sim}} 2^{-\frac{3}{2} + \frac{1}{2} r^{\sim}} \pi^2 (r^{\sim 4} + 36 r^{\sim 3} + 620 r^{\sim 2} + 5520 r^{\sim} \right. \\
& \left. + 20736) \operatorname{LaguerreL}\left(-\frac{1}{2} r^{\sim}, 1 + \frac{1}{2} r^{\sim}, 6\right) \csc\left(\frac{1}{2} \pi r^{\sim}\right) \right) \\
& "MGF", \int_0^{\infty} \frac{324 (x^2 + 5) x e^{x(t - 2x)}}{(x^2 + 3)^5} dx \\
324 \&, \{\operatorname{frac} \{ \operatorname{left}(\{x\}^{2}+5 \operatorname{right}) \{ \operatorname{rm} e\}^{-2 \&, \{x\}^{2}}\} x\} \\
\& \{ \\
& \operatorname{left}(\{x\}^{2}+3 \operatorname{right})^5\} \\
& "i is", 3, \\
& " \\
& ----- \\
& -----" \\
g & := t \rightarrow \frac{1}{t} \\
l & := 0 \\
u & := \infty \\
Temp & := \left[\left[y^{\sim} \rightarrow \frac{162 (1 + 5 y^{\sim}) e^{-\frac{2}{y^{\sim}}} y^{\sim 2}}{(1 + 3 y^{\sim})^5} \right], [0, \infty], ["Continuous", "PDF"] \right] \\
& "l and u", 0, \infty
\end{aligned}$$

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

$$\text{"f(x)"}, \frac{162 (1+5x) e^{-\frac{2}{x}} x^2}{(1+3x)^5}$$

$$\text{"F(x)"}, \frac{81 x^4 e^{-\frac{2}{x}}}{81 x^4 + 108 x^3 + 54 x^2 + 12 x + 1}$$

ERROR(IDF): Could not find the appropriate inverse

$$\text{"IDF(x)"}, \left[\left[s \rightarrow \frac{1}{2 \text{LambertW} \left(\frac{3}{2} \frac{e^{\frac{3}{2}}}{s^{1/4}} \right) - 3} \right], [0, 1], \text{"Continuous", "IDF"} \right]$$

$$\text{"S(x)"}, -\frac{81 x^4 e^{-\frac{2}{x}} - 81 x^4 - 108 x^3 - 54 x^2 - 12 x - 1}{81 x^4 + 108 x^3 + 54 x^2 + 12 x + 1}$$

$$\text{"h(x)"}, -\frac{162 x^2 e^{-\frac{2}{x}} (1+5x)}{\left(81 x^4 e^{-\frac{2}{x}} - 81 x^4 - 108 x^3 - 54 x^2 - 12 x - 1\right) (1+3x)}$$

"mean and variance", ∞ , undefined

$$\text{"MF"}, 9 2^{r\sim} \left(264 \Gamma(-r\sim - 3) r\sim - 570 \Gamma(-r\sim - 3) r\sim^2 + 96 \Gamma(-r\sim - 3) r\sim^3 - 6 \Gamma(-r\sim - 3) r\sim^4 + 9000 \Gamma(-r\sim - 3) \right.$$

$$+ \frac{2^{1-r\sim} 3^{-1-r\sim} \left(90 - \frac{529}{12} r\sim + \frac{215}{24} r\sim^2 - \frac{11}{12} r\sim^3 + \frac{1}{24} r\sim^4 \right) e^6 \pi}{\sin(\pi r\sim)}$$

$$+ 2^{1-r\sim} 3^{-1-r\sim} \left(-270 - \frac{1}{24} r\sim^5 + \frac{169}{4} r\sim + \frac{413}{24} r\sim^2 - \frac{149}{24} r\sim^3 \right.$$

$$\left. + \frac{19}{24} r\sim^4 \right) e^6 \Gamma(r\sim + 3, 6) \Gamma(-r\sim - 3) - \frac{1}{\sin(\pi r\sim)} \left(2^{-2-r\sim} 3^{-2-r\sim} \pi^2 (r\sim^5 \right.$$

$$\left. - 28 r\sim^4 + 347 r\sim^3 - 2348 r\sim^2 + 8508 r\sim - 12960 \right) \text{LaguerreL}(r\sim, -r\sim,$$

$$6) \csc(\pi r\sim)) - \frac{1}{\sin(\pi r\sim)} \left(2^{-1-r\sim} 3^{-1-r\sim} \pi^2 (r\sim^4 - 22 r\sim^3 + 215 r\sim^2 - 1058 r\sim \right.$$

$$\begin{aligned}
& + 2160) \operatorname{LaguerreL}(r, 1 - r, 6) \csc(\pi r) \Big) \Big) + 45 2^{r+1} \left(-612 \Gamma(-4 - r) r \right. \\
& \left. - 318 \Gamma(-4 - r) r^2 + 72 \Gamma(-4 - r) r^3 - 6 \Gamma(-4 - r) r^4 + 8784 \Gamma(-4 - r) \right. \\
& - \frac{2^{-r} 3^{-2-r} \left(54 - \frac{115}{4} r + \frac{155}{24} r^2 - \frac{3}{4} r^3 + \frac{1}{24} r^4 \right) e^6 \pi}{\sin(\pi r)} + 2^{-r} 3^{-2-r} \left(\right. \\
& - 216 - \frac{1}{24} r^5 + 61 r + \frac{35}{12} r^2 - \frac{83}{24} r^3 + \frac{7}{12} r^4 \Big) e^6 \Gamma(4 + r, 6) \Gamma(-4 \\
& - r) + \frac{1}{\sin(\pi r)} \left(2^{-r-3} 3^{-r-3} \pi^2 (r^5 - 24 r^4 + 263 r^3 - 1620 r^2 + 5436 r \right. \\
& - 7776) \operatorname{LaguerreL}(r, -r, 6) \csc(\pi r) \Big) + \frac{1}{\sin(\pi r)} \left(2^{-2-r} 3^{-2-r} \pi^2 (r^4 \right. \\
& \left. - 18 r^3 + 155 r^2 - 690 r + 1296) \operatorname{LaguerreL}(r, 1 - r, 6) \csc(\pi r) \right) \Big)
\end{aligned}$$

"MGF",
$$\int_0^\infty \frac{162 (1 + 5 x) x^2 e^{\frac{t x^2 - 2}{x}}}{(1 + 3 x)^5} dx$$

$$\frac{162 \left(1 + 5 x \right) x^2 e^{\frac{t x^2 - 2}{x}}}{\left(1 + 3 x \right)^5} dx$$

$$\frac{162 \left(\tan(y) + 5 \right) e^{-2 \tan(y)} \left(1 + \tan(y)^2 \right)}{\left(\tan(y) + 3 \right)^5}$$

"i is", 4,

" _____" _____

$$g := t \rightarrow \arctan(t) \\
 l := 0 \\
 u := \infty$$

$$Temp := \left[\left[y \rightarrow \frac{162 \left(\tan(y) + 5 \right) e^{-2 \tan(y)} \left(1 + \tan(y)^2 \right)}{\left(\tan(y) + 3 \right)^5} \right], \left[0, \frac{1}{2} \pi \right], \left["Continuous", \right. \\
 \left. "PDF" \right]$$

"l and u", 0, ∞

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

$$"f(x)", \frac{162 \left(\tan(x) + 5 \right) e^{-2 \tan(x)} \left(1 + \tan(x)^2 \right)}{\left(\tan(x) + 3 \right)^5}$$

$$"F(x)", \begin{cases} -\frac{81 \cos(x)^4 e^{-\frac{2 \sin(x)}{\cos(x)}} - 1 - 28 \cos(x)^4 - 96 \cos(x)^3 \sin(x) - 52 \cos(x)^2 - 12 \sin(x) \cos(x)}{28 \cos(x)^4 + 96 \cos(x)^3 \sin(x) + 52 \cos(x)^2 + 12 \sin(x) \cos(x) + 1} & x \leq \frac{1}{2} \pi \\ \infty (\cos(x)^4 + \cos(x)^2 + 1) & 0 < x \leq \frac{1}{2} \pi \end{cases}$$

$$"S(x)", \begin{cases} \frac{81 \cos(x)^4 e^{-\frac{2 \sin(x)}{\cos(x)}}}{28 \cos(x)^4 + 96 \cos(x)^3 \sin(x) + 52 \cos(x)^2 + 12 \sin(x) \cos(x) + 1} & x \leq \frac{1}{2} \pi \\ -\infty & \frac{1}{2} \pi < x \end{cases}$$

$$"h(x)", \begin{cases} \frac{2 (\sin(x) + 5 \cos(x))}{(\sin(x) + 3 \cos(x)) \cos(x)^2} & x \leq \frac{1}{2} \pi \\ 0 & \frac{1}{2} \pi < x \end{cases}$$

"mean and variance", -162

$$\int_0^{\frac{1}{2} \pi}$$

$$\frac{e^{-\frac{2 \sin(x)}{\cos(x)}} (\sin(x) + 5 \cos(x)) \cos(x)^2 x}{12 \cos(x)^5 - 316 \cos(x)^4 \sin(x) - 240 \cos(x)^3 - 88 \cos(x)^2 \sin(x) - 15 \cos(x) - \sin(x)}$$

$$dx \Bigg), -162 \Bigg\}$$

$$\int_0^{\frac{1}{2} \pi}$$

$$\frac{e^{-\frac{2 \sin(x)}{\cos(x)} (\sin(x) + 5 \cos(x)) \cos(x)^2 x^2}}{12 \cos(x)^5 - 316 \cos(x)^4 \sin(x) - 240 \cos(x)^3 - 88 \cos(x)^2 \sin(x) - 15 \cos(x) - \sin(x)}$$

$$\left. \frac{dx}{-26244} \right\}$$

$$\left. \int_0^{\frac{1}{2}\pi} \right.$$

$$\frac{e^{-\frac{2 \sin(x)}{\cos(x)} (\sin(x) + 5 \cos(x)) \cos(x)^2 x}}{12 \cos(x)^5 - 316 \cos(x)^4 \sin(x) - 240 \cos(x)^3 - 88 \cos(x)^2 \sin(x) - 15 \cos(x) - \sin(x)}$$

$$\left. \frac{dx}{-26244} \right\}^2$$

$$\text{"MF", } \int_0^{\frac{1}{2}\pi} \frac{162 x^{\sim} (\tan(x) + 5) e^{-2 \tan(x)} (1 + \tan(x)^2)}{(\tan(x) + 3)^5} dx$$

$$\text{"MGF", } -162 \left. \int_0^{\frac{1}{2}\pi} \right.$$

$$\left. \int_0^{\frac{1}{2}\pi} \right.$$

$$\frac{e^{\frac{tx \cos(x) - 2 \sin(x)}{\cos(x)}} (\sin(x) + 5 \cos(x)) \cos(x)^2}{12 \cos(x)^5 - 316 \cos(x)^4 \sin(x) - 240 \cos(x)^3 - 88 \cos(x)^2 \sin(x) - 15 \cos(x) - \sin(x)}$$

$$\left. \frac{d}{dx} \right)$$

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

$$\text{variable, } \frac{1}{2} \pi$$

Resetting high to RV's maximum support value

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

$$\text{variable, } \frac{1}{2} \pi$$

Resetting high to RV's maximum support value

```
162, {\frac{ \left( \tan \left( x \right) +5 \right) \left( \ln e \right)^{-2},}{\tan \left( x \right) \left( 1+ \left( \tan \left( x \right) \right) ^{2} \right) \left( \tan \left( x \right) +3 \right) ^{5}}}
}
"i is", 5,
"
```

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \sim \rightarrow \frac{162 (\ln(y) + 5)}{(\ln(y) + 3)^5 y^3} \right], [1, \infty], ["Continuous", "PDF"] \right]$$

"l and u", 0, ∞

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

$$\text{"f(x)", } \frac{162 (\ln(x) + 5)}{(\ln(x) + 3)^5 x^3}$$

$$\text{"F(x)", } \frac{x^2 \ln(x)^4 + 12 x^2 \ln(x)^3 + 54 x^2 \ln(x)^2 + 108 x^2 \ln(x) + 81 x^2 - 81}{x^2 (\ln(x)^4 + 12 \ln(x)^3 + 54 \ln(x)^2 + 108 \ln(x) + 81)}$$

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

$$\text{"S(x)"}, \frac{x^2 (\ln(x)^4 + 12 \ln(x)^3 + 54 \ln(x)^2 + 108 \ln(x) + 81)}{x^2 (\ln(x)^4 + 12 \ln(x)^3 + 54 \ln(x)^2 + 108 \ln(x) + 81)}$$

$$\text{"h(x)"}, \frac{2 (\ln(x) + 5)}{x (\ln(x) + 3)}$$

$$\text{"mean and variance"}, -\frac{27}{2} e^3 \text{Ei}(1, 3) + 5, -22 - \frac{729}{4} e^6 \text{Ei}(1, 3)^2 + 135 e^3 \text{Ei}(1, 3)$$

$$\text{"MF"}, 162 \left(\lim_{u \rightarrow \infty} \left(-\frac{1}{648} \frac{1}{(-u+3)^4} (e^{-3r} (-1458 r^3 e^{3r} + 5346 r^2 e^{3r} + 2187 I e^6 r^4 \pi \text{signum}(-2+r)^2 - 13122 I e^6 r^3 \pi \text{signum}(-2+r)^2 + 26244 I e^6 r^2 \pi \text{signum}(-2+r)^2 - 17496 I e^6 r \pi \text{signum}(-2+r)^2 - 4374 r^4 e^6 \text{Ei}(1, 6 - 3r) + 26244 r^3 e^6 \text{Ei}(1, 6 - 3r) - 52488 e^6 r^2 \text{Ei}(1, 6 - 3r) + 34992 r e^6 \text{Ei}(1, 6 - 3r) - 5184 r e^{3r} - 4 e^{3r} u^4 - 324 e^{3r} - 2187 I r^4 e^6 \pi + 13122 I r^3 e^6 \pi - 26244 I r^2 e^6 \pi + 17496 I r e^6 \pi - 48 e^{3r} u^3 - 216 e^{3r} u^2 + 324 e^{3r} e^{(-2+r)} u - 432 e^{3r} u + 1458 e^{3r} e^{(-2+r)} u r^3 - 1944 e^{3r} r^3 u + 7128 e^{3r} r^2 u - 3456 e^{3r} r u^2 + 5184 e^{3r} e^{(-2+r)} u r - 6912 e^{3r} r u - 18 e^{3r} r^3 u^4 - 216 e^{3r} r^3 u^3 + 66 e^{3r} r^2 u^4 - 972 e^{3r} r^3 u^2 + 792 e^{3r} r^2 u^3 - 64 e^{3r} r u^4 - 768 e^{3r} r u^3 - 5346 e^{3r} e^{(-2+r)} u r^2 + 3564 e^{3r} r^2 u^2 + 27 I \pi e^6 \text{signum}(-2+r)^2 r^4 u^4 + 324 I \pi e^6 \text{signum}(-2+r)^2 r^4 u^3 - 162 I \pi e^6 \text{signum}(-2+r)^2 r^3 u^4 + 1458 I \pi e^6 \text{signum}(-2+r)^2 r^4 u^2 - 1944 I \pi e^6 \text{signum}(-2+r)^2 r^3 u^3 + 324 I \pi e^6 \text{signum}(-2+r)^2 r^2 u^4 + 2916 I \pi e^6 \text{signum}(-2+r)^2 r^4 u - 8748 I \pi e^6 \text{signum}(-2+r)^2 r^3 u^2 + 3888 I \pi e^6 \text{signum}(-2+r)^2 r^2 u^3 - 216 I \pi e^6 \text{signum}(-2+r)^2 r u^4 - 17496 I \pi e^6 \text{signum}(-2+r)^2 r^3 u + 17496 I \pi e^6 \text{signum}(-2+r)^2 r^2 u^2 - 2592 I \pi e^6 \text{signum}(-2+r)^2 r u^3 + 34992 I \pi e^6 \text{signum}(-2+r)^2 r^2 u - 11664 I \pi e^6 \text{signum}(-2+r)^2 r u^2 - 23328 I \pi e^6 \text{signum}(-2+r)^2 r u + 648 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^2 u^4 + 5832 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^4 u - 17496 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^3 u^2 + 7776 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^2 u^3 - 432 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r u^4 - 34992 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^3 u + 34992 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^2 u^2 - 5184 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r u^3 + 69984 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r^2 u - 23328 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r u^2 - 46656 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3r + 6) r u - 27 I \pi e^6 r^4 u^4 - 324 I \pi e^6 r^4 u^3 + 162 I \pi e^6 r^3 u^4 - 1458 I \pi e^6 r^4 u^2 + 1944 I \pi e^6 r^3 u^3 - 324 I \pi e^6 r^2 u^4 - 2916 I \pi e^6 r^4 u \right)$$

$$\begin{aligned}
& + 8748 \text{I}\pi e^6 r^3 u^2 - 3888 \text{I}\pi e^6 r^2 u^3 + 216 \text{I}\pi e^6 r u^4 + 17496 \text{I}\pi e^6 r^3 u \\
& - 17496 \text{I}\pi e^6 r^2 u^2 + 2592 \text{I}\pi e^6 r u u^3 - 34992 \text{I}\pi e^6 r^2 u + 11664 \text{I}\pi e^6 r u u^2 \\
& + 23328 \text{I}\pi e^6 r u u + 54 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3 r + 6) r^4 u^4 \\
& + 648 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3 r + 6) r^4 u^3 - 324 e^{6-3r} e^{3r} \text{Ei}(1, \\
& -u r + 2 u - 3 r + 6) r^3 u^4 + 2916 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3 r \\
& + 6) r^4 u^2 - 3888 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3 r + 6) r^3 u^3 \\
& + 54 e^{3r} e^{(-2+r)} u r^3 u^3 - 2916 e^6 \text{Ei}(1, 6 - 3 r) r^4 u^2 + 3888 e^6 \text{Ei}(1, 6 \\
& - 3 r) r^3 u^3 - 648 e^6 \text{Ei}(1, 6 - 3 r) r^2 u^4 + 4374 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u \\
& - 3 r + 6) r^4 + 486 e^{3r} e^{(-2+r)} u r^3 u^2 - 216 e^{3r} e^{(-2+r)} u r^2 u^3 \\
& - 5832 e^6 \text{Ei}(1, 6 - 3 r) r^4 u + 17496 e^6 \text{Ei}(1, 6 - 3 r) r^3 u^2 - 7776 e^6 \text{Ei}(1, 6 \\
& - 3 r) r^2 u^3 + 432 e^6 \text{Ei}(1, 6 - 3 r) r u^4 - 26244 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u \\
& - 3 r + 6) r^3 + 1458 e^{3r} e^{(-2+r)} u r^3 u - 1890 e^{3r} e^{(-2+r)} u r^2 u^2 \\
& + 216 e^{3r} e^{(-2+r)} u r u^3 + 34992 e^6 \text{Ei}(1, 6 - 3 r) r^3 u - 34992 e^6 \text{Ei}(1, 6 \\
& - 3 r) r^2 u^2 + 5184 e^6 \text{Ei}(1, 6 - 3 r) r u^3 + 52488 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u \\
& - 3 r + 6) r^2 - 5508 e^{3r} e^{(-2+r)} u r^2 u + 1836 e^{3r} e^{(-2+r)} u r u^2 \\
& - 69984 e^6 \text{Ei}(1, 6 - 3 r) r^2 u + 23328 e^6 \text{Ei}(1, 6 - 3 r) r u^2 \\
& - 34992 e^{6-3r} e^{3r} \text{Ei}(1, -u r + 2 u - 3 r + 6) r + 5292 e^{3r} e^{(-2+r)} u r u \\
& + 46656 e^6 \text{Ei}(1, 6 - 3 r) r u - 54 e^6 \text{Ei}(1, 6 - 3 r) r^4 u^4 - 648 e^6 \text{Ei}(1, 6 \\
& - 3 r) r^4 u^3 + 324 e^6 \text{Ei}(1, 6 - 3 r) r^3 u^4))) \\
& \text{"MGF", } \int_1^{\infty} \frac{162 e^{tx} (\ln(x) + 5)}{(\ln(x) + 3)^5 x^3} dx
\end{aligned}$$

*WARNING(PlotDist): Low value provided by user, 0
is less than minimum support value of random variable*

1

Resetting low to RV's minimum support value

*WARNING(PlotDist): Low value provided by user, 0
is less than minimum support value of random variable*

1

Resetting low to RV's minimum support value

```
162, {\frac {\ln \left( \left( x \right) +5 \right) \left( \ln \left( \left( x \right) +5 \right) +3 \right) ^{5} \left( x \right) ^{3}}{}}\\
"i is", 6,
```

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

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

$l := 0$

$u := \infty$

$Temp := \left[\left[y \rightarrow \frac{162 (\mathrm{e}^{y} + 5) \mathrm{e}^{-2 \mathrm{e}^{y} + y}}{(\mathrm{e}^{y} + 3)^5} \right], [-\infty, \infty], ["Continuous", "PDF"] \right]$
 "l and u", 0, ∞
 $"g(x)", \ln(x), "base", \frac{\left(2 + \frac{4}{x+3}\right) \mathrm{e}^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}, "GeneralizedParetoRV(2,3,4)"$
 $"f(x)", \frac{162 (\mathrm{e}^x + 5) \mathrm{e}^{-2 \mathrm{e}^x + x}}{(\mathrm{e}^x + 3)^5}$
 $"F(x)", \frac{\mathrm{e}^{4x} + 12 \mathrm{e}^{3x} + 54 \mathrm{e}^{2x} + 108 \mathrm{e}^x + 81 - 81 \mathrm{e}^{-2 \mathrm{e}^x}}{\mathrm{e}^{4x} + 12 \mathrm{e}^{3x} + 54 \mathrm{e}^{2x} + 108 \mathrm{e}^x + 81}$
 $"IDF(x)", [[], [0, 1], ["Continuous", "IDF"]]$
 $"S(x)", \frac{81 \mathrm{e}^{-2 \mathrm{e}^x}}{\mathrm{e}^{4x} + 12 \mathrm{e}^{3x} + 54 \mathrm{e}^{2x} + 108 \mathrm{e}^x + 81}$
 $"h(x)", \frac{2 (\mathrm{e}^x + 5) \mathrm{e}^x}{\mathrm{e}^x + 3}$
 "mean and variance", $\int_{-\infty}^{\infty} \frac{162 x (\mathrm{e}^x + 5) \mathrm{e}^{-2 \mathrm{e}^x + x}}{(\mathrm{e}^x + 3)^5} dx, \int_{-\infty}^{\infty} \frac{162 x^2 (\mathrm{e}^x + 5) \mathrm{e}^{-2 \mathrm{e}^x + x}}{(\mathrm{e}^x + 3)^5} dx$
 $- \left(\int_{-\infty}^{\infty} \frac{162 x (\mathrm{e}^x + 5) \mathrm{e}^{-2 \mathrm{e}^x + x}}{(\mathrm{e}^x + 3)^5} dx \right)^2$
 $"MF", \int_{-\infty}^{\infty} \frac{162 x^{r \sim} (\mathrm{e}^x + 5) \mathrm{e}^{-2 \mathrm{e}^x + x}}{(\mathrm{e}^x + 3)^5} dx$
 $"MGF", \int_{-\infty}^{\infty} \frac{162 (\mathrm{e}^x + 5) \mathrm{e}^{tx - 2 \mathrm{e}^x + x}}{(\mathrm{e}^x + 3)^5} dx$
 $162 \cdot \frac{\left(\mathrm{e}^x + 5 \right) \mathrm{e}^{-2 \mathrm{e}^x + x}}{\left(\mathrm{e}^x + 3 \right)^5}$
 $\left(\mathrm{e}^x + 5 \right) \mathrm{e}^{-2 \mathrm{e}^x + x} \cdot \left(\mathrm{e}^x + 3 \right)^5$
 $"i is", 7,$
 $"-----"$
 $g := t \rightarrow \mathrm{e}^{-t}$
 $l := 0$
 $u := \infty$
 $Temp := \left[\left[y \rightarrow \frac{162 (\ln(y) - 5) y}{(\ln(y) - 3)^5} \right], [0, 1], ["Continuous", "PDF"] \right]$

"l and u", 0, ∞
 "g(x)", e^{-x} , "base", $\frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}$, "GeneralizedParetoRV(2,3,4)"
 "f(x)", $\frac{162 (\ln(x) - 5) x}{(\ln(x) - 3)^5}$
 "F(x)",
$$\begin{cases} \frac{81 x^2}{\ln(x)^4 - 12 \ln(x)^3 + 54 \ln(x)^2 - 108 \ln(x) + 81} & x \leq e^3 \\ \text{undefined} & e^3 < x \end{cases}$$

 "IDF(x)", $[\exp @ (s \rightarrow \text{RootOf}(s _Z^4 - 12 s _Z^3 + 54 s _Z^2 - 81 e^{2-Z} - 108 s _Z + 81 s))]$,
 [0, 1], ["Continuous", "IDF"]
 "S(x)",
$$\begin{cases} \frac{\ln(x)^4 - 12 \ln(x)^3 + 54 \ln(x)^2 - 81 x^2 - 108 \ln(x) + 81}{\ln(x)^4 - 12 \ln(x)^3 + 54 \ln(x)^2 - 108 \ln(x) + 81} & x \leq e^3 \\ \text{undefined} & e^3 < x \end{cases}$$

 "h(x)",
$$\begin{cases} \frac{162 x (\ln(x) - 5)}{(\ln(x)^4 - 12 \ln(x)^3 + 54 \ln(x)^2 - 81 x^2 - 108 \ln(x) + 81) (\ln(x) - 3)} & x \leq e^3 \\ \text{undefined} & e^3 < x \end{cases}$$

 "mean and variance", $-36 + \frac{729}{2} e^9 \text{Ei}(1, 9)$, $1728 e^{12} \text{Ei}(1, 12) - 1429 + 26244 e^9 \text{Ei}(1, 9)$
 $- \frac{531441}{4} e^{18} \text{Ei}(1, 9)^2$
 "MF", $-\frac{9}{2} r \sim^3 - \frac{33}{2} r \sim^2 - 16 r \sim + 162 e^{6+3r \sim} \text{Ei}(1, 6+3r \sim) r \sim^2 + 108 e^{6+3r \sim} \text{Ei}(1, 6$
 $+ 3r \sim) r \sim + \frac{27}{2} e^{6+3r \sim} \text{Ei}(1, 6+3r \sim) r \sim^4 + 81 e^{6+3r \sim} \text{Ei}(1, 6+3r \sim) r \sim^3 + 1$
 "MGF", $162 \left(\int_0^1 \frac{e^{tx} (\ln(x) - 5) x}{(\ln(x) - 3)^5} dx \right)$

WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random variable, 1

Resetting high to RV's maximum support value

WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random variable, 1

Resetting high to RV's maximum support value

```
162, {\frac { \left( \ln \left( \left( x \right) -5 \right) x \right) { \left( \ln \left( x \right) -3 \right) }^5}{e^{tx}}}}{\int_0^1
```

```

\left( x \right) -3 \left( x \right) ^{5} \} \} \\
"i is", 8, \\
" \\
Temp := \left[ \left[ y \rightarrow \frac{162 \left( 1+5 e^{y} \right) e^{\left( 3 y- e^{y}-2 \right) e^{-y}}}{\left( 1+3 e^{y} \right)^5} \right], [-\infty, \infty], ["Continuous", "PDF"] \right] \\
"l and u", 0, \infty \\
"g(x)", -\ln(x), "base", \frac{\left( 2+\frac{4}{x+3} \right) e^{-2x}}{\left( 1+\frac{1}{3}x \right)^4}, "GeneralizedParetoRV(2,3,4)" \\
"f(x)", \frac{162 \left( 1+5 e^x \right) e^{\left( 3 x e^x-2 \right) e^{-x}}}{\left( 1+3 e^x \right)^5} \\
"F(x)", \frac{81 e^{2 \left( 2 x e^x-1 \right) e^{-x}}}{81 e^{4x}+108 e^{3x}+54 e^{2x}+12 e^x+1} \\
"IDF(x)", \left[ \left[ s \rightarrow RootOf \left( -e^{-Z} \ln \left( s \left( 3 e^{-Z}+1 \right)^4 \right) +4 e^{-Z} \ln(3) +4 Z e^{-Z}-2 \right) \right], [0, 1], \right. \\
\left. ["Continuous", "IDF"] \right] \\
"S(x)", \frac{81 e^{4x}+108 e^{3x}+54 e^{2x}+12 e^x-81 e^{2 \left( 2 x e^x-1 \right) e^{-x}}+1}{81 e^{4x}+108 e^{3x}+54 e^{2x}+12 e^x+1} \\
"h(x)", -\frac{162 e^{\left( 3 x e^x-2 \right) e^{-x}} \left( 1+5 e^x \right)}{\left( -81 e^{4x}-108 e^{3x}-54 e^{2x}+81 e^{2 \left( 2 x e^x-1 \right) e^{-x}}-12 e^x-1 \right) \left( 1+3 e^x \right)} \\
"mean and variance", \int_{-\infty}^{\infty} \frac{162 x \left( 1+5 e^x \right) e^{\left( 3 x e^x-2 \right) e^{-x}}}{\left( 1+3 e^x \right)^5} dx, \\
\int_{-\infty}^{\infty} \frac{162 x^2 \left( 1+5 e^x \right) e^{\left( 3 x e^x-2 \right) e^{-x}}}{\left( 1+3 e^x \right)^5} dx - \left( \int_{-\infty}^{\infty} \frac{162 x \left( 1+5 e^x \right) e^{\left( 3 x e^x-2 \right) e^{-x}}}{\left( 1+3 e^x \right)^5} dx \right)^2 \\
"MF", \int_{-\infty}^{\infty} \frac{162 x^{r \sim} \left( 1+5 e^x \right) e^{\left( 3 x e^x-2 \right) e^{-x}}}{\left( 1+3 e^x \right)^5} dx \\
"MGF", \int_{-\infty}^{\infty} \frac{162 \left( 1+5 e^x \right) e^{\left( t x e^x+3 x e^x-2 \right) e^{-x}}}{\left( 1+3 e^x \right)^5} dx \\
162 \left( x \right) -3 \left( x \right) ^{5} \} \} \\

```

```

x} }) \left( 1+5\,{\rm e}^x \right)^5 \right) \left\{ \left( 1+3\,{\rm e}^x \right)^3 \right\} \\ "i is", 9,
" -----
-----
g := t->ln(t+1)
l := 0
u := infinity
Temp := \left[ \left[ y~\rightarrow~\frac{162 \left( {\rm e}^{y~}+4 \right) {\rm e}^{-2 {\rm e}^{y~}+2+y~}}{\left( {\rm e}^{y~}+2 \right)^5} \right], [0, infinity], ["Continuous", "PDF"] \right]
"l and u", 0, infinity
"g(x)", ln(x+1), "base", \frac{\left(2+\frac{4}{x+3}\right){\rm e}^{-2x}}{\left(1+\frac{1}{3}x\right)^4}, "GeneralizedParetoRV(2,3,4)"
"f(x)", \frac{162 \left( {\rm e}^x+4 \right) {\rm e}^{-2 {\rm e}^x+2+x}}{\left( {\rm e}^x+2 \right)^5}
"F(x)", \frac{-81 {\rm e}^{2-2 {\rm e}^x}+{\rm e}^{4x}+8 {\rm e}^{3x}+24 {\rm e}^{2x}+32 {\rm e}^x+16}{{\rm e}^{4x}+8 {\rm e}^{3x}+24 {\rm e}^{2x}+32 {\rm e}^x+16}
"IDF(x)", [[], [0, 1], ["Continuous", "IDF"]]
"S(x)", \frac{81 {\rm e}^{2-2 {\rm e}^x}}{{\rm e}^{4x}+8 {\rm e}^{3x}+24 {\rm e}^{2x}+32 {\rm e}^x+16}
"h(x)", \frac{2 \left( {\rm e}^x+4 \right) {\rm e}^x}{{\rm e}^x+2}
"mean and variance", \int_0^{\infty} \frac{162 x \left( {\rm e}^x+4 \right) {\rm e}^{-2 {\rm e}^x+2+x}}{\left( {\rm e}^x+2 \right)^5} dx, \int_0^{\infty} \frac{162 x^2 \left( {\rm e}^x+4 \right) {\rm e}^{-2 {\rm e}^x+2+x}}{\left( {\rm e}^x+2 \right)^5} dx
-\left( \int_0^{\infty} \frac{162 x \left( {\rm e}^x+4 \right) {\rm e}^{-2 {\rm e}^x+2+x}}{\left( {\rm e}^x+2 \right)^5} dx \right)^2
"MF", \int_0^{\infty} \frac{162 x^{y~} \left( {\rm e}^x+4 \right) {\rm e}^{-2 {\rm e}^x+2+x}}{\left( {\rm e}^x+2 \right)^5} dx
"MGF", \int_0^{\infty} \frac{162 \left( {\rm e}^x+4 \right) {\rm e}^{tx-2 {\rm e}^x+2+x}}{\left( {\rm e}^x+2 \right)^5} dx
162\,{\rm e}^x, {\frac { \left( \left( {\rm e}^x+4 \right) {\rm e}^{tx-2 {\rm e}^x+2+x} \right) }{ \left( {\rm e}^x+2 \right)^5 }} \\ {\rm e}^{tx-2 {\rm e}^x+2+x}

```

```

"} }+2+x} }}{\left(\left(\mathrm{e}^x\right)^2+2\right)^5}\\
"i is", 10,
"-----"
-----"
g := t → 1/ln(t+2)
l := 0
u := ∞
Temp := 
$$\left[ \left[ y \rightarrow \frac{162 \left( \mathrm{e}^{\frac{1}{y}} + 3 \right) \mathrm{e}^{-\frac{2 \mathrm{e}^y y - 4 y - 1}{y}}}{\left( \mathrm{e}^{\frac{1}{y}} + 1 \right)^5 y^2} \right], \left[ 0, \frac{1}{\ln(2)} \right], \left[ "Continuous", "PDF" \right] \right]$$

"l and u", 0, ∞
"g(x)",  $\frac{\left( 2 + \frac{4}{x+3} \right) \mathrm{e}^{-2x}}{\left( 1 + \frac{1}{3} x \right)^4}$ , "GeneralizedParetoRV(2,3,4)"
"f(x)",  $\frac{162 \left( \mathrm{e}^{\frac{1}{x}} + 3 \right) \mathrm{e}^{-\frac{2 \mathrm{e}^x x - 4 x - 1}{x}}}{\left( \mathrm{e}^{\frac{1}{x}} + 1 \right)^5 x^2}$ 
"F(x)",  $\frac{81 \mathrm{e}^{4-2\mathrm{e}^x}}{\mathrm{e}^{\frac{4}{x}} + 4 \mathrm{e}^{\frac{3}{x}} + 6 \mathrm{e}^{\frac{2}{x}} + 4 \mathrm{e}^{\frac{1}{x}} + 1}$ 
"IDF(x)", [[ ], [0, 1], ["Continuous", "IDF"]]
"S(x)",  $\frac{\mathrm{e}^{\frac{4}{x}} + 4 \mathrm{e}^{\frac{3}{x}} + 6 \mathrm{e}^{\frac{2}{x}} + 4 \mathrm{e}^{\frac{1}{x}} - 81 \mathrm{e}^{4-2\mathrm{e}^x} + 1}{\mathrm{e}^{\frac{4}{x}} + 4 \mathrm{e}^{\frac{3}{x}} + 6 \mathrm{e}^{\frac{2}{x}} + 4 \mathrm{e}^{\frac{1}{x}} + 1}$ 
"h(x)",  $-\frac{162 \mathrm{e}^{-\frac{2 \mathrm{e}^x x - 4 x - 1}{x}} \left( \mathrm{e}^{\frac{1}{x}} + 3 \right)}{\left( -\mathrm{e}^{\frac{4}{x}} - 4 \mathrm{e}^{\frac{3}{x}} - 6 \mathrm{e}^{\frac{2}{x}} - 4 \mathrm{e}^{\frac{1}{x}} + 81 \mathrm{e}^{4-2\mathrm{e}^x} - 1 \right) x^2 \left( \mathrm{e}^{\frac{1}{x}} + 1 \right)}$ 

```

"mean and variance", 162

$$\left[\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}} + 3 \right) e^{-\frac{2e^x x - 4x - 1}{x}}}{x \left(e^{\frac{1}{x}} + 1 \right)^5} dx \right], 162$$

$$\left[\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}} + 3 \right) e^{-\frac{2e^x x - 4x - 1}{x}}}{\left(e^{\frac{1}{x}} + 1 \right)^5} dx \right] - 26244 \left[\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}} + 3 \right) e^{-\frac{2e^x x - 4x - 1}{x}}}{x \left(e^{\frac{1}{x}} + 1 \right)^5} dx \right]^2$$

"MF",

$$\int_0^{\frac{1}{\ln(2)}} \frac{162 x^{\sim} \left(e^{\frac{1}{x}} + 3 \right) e^{-\frac{2e^x x - 4x - 1}{x}}}{\left(e^{\frac{1}{x}} + 1 \right)^5 x^2} dx$$

"MGF", 162

$$\left[\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{\frac{1}{x}} + 3 \right) e^{-\frac{-tx^2 + 2e^x x - 4x - 1}{x}}}{\left(e^{\frac{1}{x}} + 1 \right)^5 x^2} dx \right]$$

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

variable, $\frac{1}{\ln(2)}$

Resetting high to RV's maximum support value

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

variable, $\frac{1}{\ln(2)}$

Resetting high to RV's maximum support value

```

162\, , {\frac { {{\rm e}^{{{\left ( -1 \right )}^5}}}+3}{{\left ( -1 \right )}+1}}\left ( \left ( {\frac {2\,{\rm e}^{{{\left ( -1 \right )}^5}}}{x-4}}+x-1 \right ) \right ) \} \\
"i is", 11,
"
-----"
-----"
g := t->tanh(t)
l := 0
u := infinity
Temp := [[y~> -162*(arctanh(y~)+5)/((arctanh(y~)+3)^5*(y~+1)^2), [0, 1], ["Continuous", "PDF"]]]
"l and u", 0, infinity
"g(x)", tanh(x), "base", 
$$\frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3} x\right)^4}$$
, "GeneralizedParetoRV(2,3,4)"
"f(x)", 
$$\frac{162 (\operatorname{arctanh}(x)+5)}{(\operatorname{arctanh}(x)+3)^5 (x+1)^2}$$

"F(x)", 
$$(x \operatorname{arctanh}(x)^4 + \operatorname{arctanh}(x)^4 + 12 x \operatorname{arctanh}(x)^3 + 12 \operatorname{arctanh}(x)^3 + 54 x \operatorname{arctanh}(x)^2 + 54 \operatorname{arctanh}(x)^2 + 108 x \operatorname{arctanh}(x) + 108 \operatorname{arctanh}(x) + 162 x) / (x \operatorname{arctanh}(x)^4 + 12 x \operatorname{arctanh}(x)^3 + 54 x \operatorname{arctanh}(x)^2 + 108 x \operatorname{arctanh}(x) + 81 x + \operatorname{arctanh}(x)^4 + 12 \operatorname{arctanh}(x)^3 + 54 \operatorname{arctanh}(x)^2 + 108 \operatorname{arctanh}(x) + 81)$$

"IDF(x)", [[], [0, 1], ["Continuous", "IDF"]]
"S(x)", 
$$-(81 (x-1)) / (x \operatorname{arctanh}(x)^4 + 12 x \operatorname{arctanh}(x)^3 + 54 x \operatorname{arctanh}(x)^2 + 108 x \operatorname{arctanh}(x) + 81 x + \operatorname{arctanh}(x)^4 + 12 \operatorname{arctanh}(x)^3 + 54 \operatorname{arctanh}(x)^2 + 108 \operatorname{arctanh}(x) + 81)$$

"h(x)", 
$$-\frac{2 (\operatorname{arctanh}(x)+5)}{(\operatorname{arctanh}(x)+3) (x^2-1)}$$

"mean and variance", 162 
$$\left( \int_0^1 \frac{x (\operatorname{arctanh}(x)+5)}{(\operatorname{arctanh}(x)+3)^5 (x+1)^2} dx \right), 162 \left( \int_0^1 \frac{x^2 (\operatorname{arctanh}(x)+5)}{(\operatorname{arctanh}(x)+3)^5 (x+1)^2} dx \right) - 26244 \left( \int_0^1 \frac{x (\operatorname{arctanh}(x)+5)}{(\operatorname{arctanh}(x)+3)^5 (x+1)^2} dx \right)^2$$

"MF", 
$$\int_0^1 \frac{162 x^r \sim (\operatorname{arctanh}(x)+5)}{(\operatorname{arctanh}(x)+3)^5 (x+1)^2} dx$$


```

$$\text{"MGF", 162} \left(\int_0^1 \frac{e^{tx} (\operatorname{arctanh}(x) + 5)}{(\operatorname{arctanh}(x) + 3)^5 (x + 1)^2} dx \right)$$

WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random variable, 1

Resetting high to RV's maximum support value

WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random variable, 1

Resetting high to RV's maximum support value

162\, , {\frac { {\{\rm arctanh} \left(x \right) +5} { \left({\rm arctanh} \left(x \right) +3 \right) ^5 \left(x+1 \right) ^2}}{}}
 "i is", 12,

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

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

$$l := 0$$

$$u := \infty$$

Temp := $\left[\left[y \rightarrow \frac{162 (\operatorname{arcsinh}(y) + 5)}{(\operatorname{arcsinh}(y) + 3)^5 (y + \sqrt{y^2 + 1})^2 \sqrt{y^2 + 1}} \right], [0, \infty], \text{"Continuous", "PDF"} \right]$

"l and u", 0, ∞

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

$$\text{"f(x)", } \frac{162 (\operatorname{arcsinh}(x) + 5)}{(\operatorname{arcsinh}(x) + 3)^5 (x + \sqrt{x^2 + 1})^2 \sqrt{x^2 + 1}}$$

$$\begin{aligned} \text{"F(x)", } & \left(\ln(-x + \sqrt{x^2 + 1})^4 - 12 \ln(-x + \sqrt{x^2 + 1})^3 + 54 \ln(-x + \sqrt{x^2 + 1})^2 \right. \\ & \left. + 162 \sqrt{x^2 + 1} x - 162 x^2 - 108 \ln(-x + \sqrt{x^2 + 1}) \right) / \left(\ln(-x + \sqrt{x^2 + 1})^4 \right. \\ & \left. - 12 \ln(-x + \sqrt{x^2 + 1})^3 + 54 \ln(-x + \sqrt{x^2 + 1})^2 - 108 \ln(-x + \sqrt{x^2 + 1}) + 81 \right) \end{aligned}$$

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

"IDF(x)", $\left[\begin{array}{c} s \\ \frac{1}{72} \frac{16 \text{LambertW} \left(\frac{3}{2} \frac{e^{\frac{3}{2}}}{(1-s)^{1/4}} \right)^4 s - 16 \text{LambertW} \left(\frac{3}{2} \frac{e^{\frac{3}{2}}}{(1-s)^{1/4}} \right)^4 + 81}{\sqrt{1-s} \text{LambertW} \left(\frac{3}{2} \frac{e^{\frac{3}{2}}}{(1-s)^{1/4}} \right)^2} \end{array} \right], [0,$
 1], ["Continuous", "IDF"]
 "S(x)", $-\left(81 \left(2 \sqrt{x^2+1} x - 2 x^2 - 1 \right) \right) / \left(\ln(-x + \sqrt{x^2+1})^4 - 12 \ln(-x + \sqrt{x^2+1})^3 + 54 \ln(-x + \sqrt{x^2+1})^2 - 108 \ln(-x + \sqrt{x^2+1}) + 81 \right)$
 "h(x)", $-\left(2 (\text{arcsinh}(x) + 5) \left(\ln(-x + \sqrt{x^2+1})^4 - 12 \ln(-x + \sqrt{x^2+1})^3 + 54 \ln(-x + \sqrt{x^2+1})^2 - 108 \ln(-x + \sqrt{x^2+1}) + 81 \right) \right) / \left((\text{arcsinh}(x) + 3)^5 (x + \sqrt{x^2+1})^2 \sqrt{x^2+1} (2 \sqrt{x^2+1} x - 2 x^2 - 1) \right)$
 "mean and variance", $-\frac{27}{4} e^3 \text{Ei}(1, 3) - \frac{729}{4} e^9 \text{Ei}(1, 9) + \frac{41}{2}, -\frac{729}{16} e^6 \text{Ei}(1, 3)^2 - \frac{19683}{8} \text{Ei}(1, 3) \text{Ei}(1, 9) e^{12} + \frac{1107}{4} e^3 \text{Ei}(1, 3) - \frac{531441}{16} e^{18} \text{Ei}(1, 9)^2 + \frac{29889}{4} e^9 \text{Ei}(1, 9) - \frac{1813}{4} + 432 e^{12} \text{Ei}(1, 12)$
 "MF", $\int_0^{\infty} \frac{162 x^{\tilde{r}} (\text{arcsinh}(x) + 5)}{(\text{arcsinh}(x) + 3)^5 (x + \sqrt{x^2+1})^2 \sqrt{x^2+1}} dx$
 "MGF", $\int_0^{\infty} \frac{162 e^{tx} (\text{arcsinh}(x) + 5)}{(\text{arcsinh}(x) + 3)^5 (x + \sqrt{x^2+1})^2 \sqrt{x^2+1}} dx$
 $162 \left(\frac{\text{arcsinh}(\text{left}(x\text{right})+5) - \text{arcsinh}(\text{left}(x\text{right})+3 \text{right})^5 \text{left}(x + \sqrt{x^2+1}) \text{right}}{\text{left}(x\text{right})+3 \text{right}} \right)$

```

^{2}
\sqrt{ \{ \{x\}^{2}+1\} \} }
"i is", 13,
"
-----
"
g := t → arcsinh(t)
l := 0
u := ∞
Temp := [ [y → (162 (sinh(y) + 5) e^{-2 sinh(y)} cosh(y)) / (sinh(y) cosh(y)^4
+ 15 cosh(y)^4 + 88 sinh(y) cosh(y)^2 + 240 cosh(y)^2 + 316 sinh(y) - 12) ], [0,
∞], ["Continuous", "PDF"] ]
"l and u", 0, ∞
"g(x)", arcsinh(x), "base", 
$$\frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}$$
, "GeneralizedParetoRV(2,3,4)"
"f(x)",
(162 (sinh(x) + 5) e^{-2 sinh(x)} cosh(x)) / (sinh(x) cosh(x)^4 + 15 cosh(x)^4
+ 88 sinh(x) cosh(x)^2 + 240 cosh(x)^2 + 316 sinh(x) - 12)
"F(x)", (e^{8x} + 24 e^{7x} + 212 e^{6x} + 792 e^{5x} + 870 e^{4x} - 1296 e^{(4x+1)e^{-x}-e^x} - 792 e^{3x}
+ 212 e^{2x} - 24 e^x + 1) / (e^{8x} + 24 e^{7x} + 212 e^{6x} + 792 e^{5x} + 870 e^{4x} - 792 e^{3x} + 212 e^{2x}
- 24 e^x + 1)
"IDF(x)", [ [s → RootOf(4 e^{-Z} ln(2) + 4 e^{-Z} ln(3) - e^{-Z} ln(-(e^{2-Z} + 6 e^{-Z} - 1)^4 (s - 1))
- e^{2-Z} + 4 _Z e^{-Z} + 1) ], [0, 1], ["Continuous", "IDF"] ]
"S(x)", 
$$\frac{1296 e^{-(e^{2x}-4x e^x-1)e^{-x}}}{e^{8x}+24 e^{7x}+212 e^{6x}+792 e^{5x}+870 e^{4x}-792 e^{3x}+212 e^{2x}-24 e^x+1}$$

"h(x)", 
$$\frac{1}{8} \left( (\sinh(x) + 5) e^{(e^{2x}-2 \sinh(x) e^x-4 x e^x-1) e^{-x}} \cosh(x) (e^{8x} + 24 e^{7x} + 212 e^{6x}
+ 792 e^{5x} + 870 e^{4x} - 792 e^{3x} + 212 e^{2x} - 24 e^x + 1) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4
+ 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12)
"mean and variance",

$$\int_0^\infty (162 x (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x)) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4
+ 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx,$$


$$\int_0^\infty$$$$

```

$$\begin{aligned}
& \left(162 x^2 (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx \\
& - \left(\int_0^\infty \left(162 x (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \right. \\
& \left. + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx \right)
\end{aligned}$$

"MF",

$$\begin{aligned}
& \int_0^\infty \left(162 x^{\prime \sim} (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx
\end{aligned}$$

"MGF",

$$\begin{aligned}
& \int_0^\infty \left(162 (\sinh(x) + 5) \cosh(x) e^{tx - 2 \sinh(x)} \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx
\end{aligned}$$

```

162, {\frac { \left( \sinh \left( x \right) +5 \right) \cosh \left( x \right) ^{4}+15 \cosh \left( x \right) ^{4}+88 \sinh \left( x \right) \cosh \left( x \right) ^{2}+240 \cosh \left( x \right) ^{2}+316 \sinh \left( x \right) -12}{ \left( \sinh \left( x \right) \cosh \left( x \right) ^{4}+15 \cosh \left( x \right) ^{4}+2 \sinh \left( x \right) \cosh \left( x \right) ^{2}+240 \cosh \left( x \right) ^{2}+316 \sinh \left( x \right) -12} } \left( \sinh \left( x \right) +5 \right) \cosh \left( x \right) ^{4}+15 \cosh \left( x \right) ^{4}+88 \sinh \left( x \right) \cosh \left( x \right) ^{2}+240 \cosh \left( x \right) ^{2}+316 \sinh \left( x \right) -12
}

```

"i is", 14,

```

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

```

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

$$l := 0$$

$$u := \infty$$

$$\begin{aligned}
Temp := & \left[\left[y \rightarrow \frac{162 (4 + \text{arccsch}(y)) e^{2 - 2 \text{arccsch}(y)}}{(2 + \text{arccsch}(y))^5 \sqrt{y^2 + 1}} \right], \left[0, \frac{2}{e - e^{-1}} \right], \text{"Continuous"}, \right. \\
& \left. \text{"PDF"} \right]
\end{aligned}$$

"l and u", 0, ∞
 "g(x)", $\text{csch}(x + 1)$, "base", $\frac{\left(2 + \frac{4}{x + 3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}$, "GeneralizedParetoRV(2,3,4)"
 "f(x)", $\frac{162 (4 + \text{arccsch}(x)) e^{2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1} |x|}$
 "F(x)", $162 \left(\int_0^x \frac{(4 + \text{arccsch}(t)) e^{2 - 2 \text{arccsch}(t)}}{(2 + \text{arccsch}(t))^5 \sqrt{t^2 + 1} |t|} dt \right)$
 "S(x)", $1 - 162 \left(\int_0^x \frac{(4 + \text{arccsch}(t)) e^{2 - 2 \text{arccsch}(t)}}{(2 + \text{arccsch}(t))^5 \sqrt{t^2 + 1} |t|} dt \right)$
 "h(x)", $- \frac{162 (4 + \text{arccsch}(x)) e^{2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1} |x| \left(-1 + 162 \left(\int_0^x \frac{(4 + \text{arccsch}(t)) e^{2 - 2 \text{arccsch}(t)}}{(2 + \text{arccsch}(t))^5 \sqrt{t^2 + 1} |t|} dt \right) \right)}$
 "mean and variance", $162 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{x (4 + \text{arccsch}(x)) e^{2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1}} dx \right), 162 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{x (4 + \text{arccsch}(x)) e^{2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1}} dx \right)^2 - 26244 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{(4 + \text{arccsch}(x)) e^{2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1}} dx \right)^2$
 "MF", $\int_0^{\frac{2}{e - e^{-1}}} \frac{162 x^r (4 + \text{arccsch}(x)) e^{2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1} |x|} dx$
 "MGF", $162 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{(4 + \text{arccsch}(x)) e^{tx + 2 - 2 \text{arccsch}(x)}}{(2 + \text{arccsch}(x))^5 \sqrt{x^2 + 1} x} dx \right)$

WARNING(PlotDist): High value provided by user, 40

is greater than maximum support value of the random

$$\text{variable, } \frac{2}{e - e^{-1}}$$

Resetting high to RV's maximum support value

WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random

$$\text{variable, } \frac{2}{e - e^{-1}}$$

Resetting high to RV's maximum support value

```
162\, , {\frac { \left( 4+{\it arccsch} \left( x \right) \right) \left( {e}^{{x}} \right) ^{5}\sqrt { \left( {x}^2+1 \right) } }{ \left( 2+{\it arccsch} \left( x \right) \right) ^{5}}}
```

"is", 15,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \rightarrow \left(162 (4 \sinh(y) + 1) e^{\frac{2(\sinh(y) - 1)}{\sinh(y)}} \cosh(y) \sinh(y)^2 \right) \right] \right]$$

$$(32 \sinh(y) \cosh(y)^4 + 80 \cosh(y)^4 + 16 \sinh(y) \cosh(y)^2 - 120 \cosh(y)^2 - 38 \sinh(y) + 41), [0, \ln(1 + \sqrt{2})], ["Continuous", "PDF"]]$$

"l and u", 0, ∞

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

"f(x)",

$$\left(162 (4 \sinh(x) + 1) e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} \cosh(x) \sinh(x)^2 \right) \left/ \left(32 \sinh(x) \cosh(x)^4 + 80 \cosh(x)^4 + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41 \right) \right.$$

$$\text{"F(x)", } \frac{81}{16} \frac{e^{2x - 1} (e^{8x} - 4e^{6x} + 6e^{4x} - 4e^{2x} + 1)}{e^{8x} + 4e^{7x} - 8e^{5x} + 8e^{3x} + 2e^{2x} + 2e^{6x} - 5e^{4x} - 4e^x + 1}$$

ERROR(IDF): Could not find the appropriate inverse

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

$$\begin{aligned}
& "S(x)" = -\frac{1}{16} \left(81 e^{\frac{2(e^{2x}-2e^x-1)}{e^{2x}-1} + 8x} - 16 e^{8x} - 64 e^{7x} - 324 e^{\frac{2(e^{2x}-2e^x-1)}{e^{2x}-1} + 6x} - 32 e^{6x} \right. \\
& + 128 e^{5x} + 486 e^{\frac{2(e^{2x}-2e^x-1)}{e^{2x}-1} + 4x} + 80 e^{4x} - 128 e^{3x} - 324 e^{\frac{2(e^{2x}-2e^x-1)}{e^{2x}-1} + 2x} \\
& \left. - 32 e^{2x} + 64 e^x + 81 e^{\frac{2(e^{2x}-2e^x-1)}{e^{2x}-1} - 16} \right) \Big/ (e^{8x} + 4 e^{7x} - 8 e^{5x} + 8 e^{3x} + 2 e^{2x} \\
& + 2 e^{6x} - 5 e^{4x} - 4 e^x + 1) \\
& "h(x)" = \left(2592 (4 \sinh(x) + 1) e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} \cosh(x) \sinh(x)^2 (e^{8x} + 4 e^{7x} - 8 e^{5x} + 8 e^{3x} \right. \\
& \left. + 2 e^{2x} + 2 e^{6x} - 5 e^{4x} - 4 e^x + 1) \right) \Big/ \left((32 \sinh(x) \cosh(x)^4 + 80 \cosh(x)^4 \right. \\
& \left. + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41) \left(\right. \right. \\
& \left. \left. - 81 e^{\frac{2(4x e^{2x} + e^{2x} - 2e^x - 4x - 1)}{e^{2x}-1}} + 16 e^{8x} + 64 e^{7x} + 324 e^{\frac{2(3x e^{2x} + e^{2x} - 2e^x - 3x - 1)}{e^{2x}-1}} \right. \right. \\
& \left. \left. + 32 e^{6x} - 128 e^{5x} - 486 e^{\frac{2(x e^{2x} + e^{2x} - 2e^x - x - 1)}{e^{2x}-1}} - 80 e^{4x} + 128 e^{3x} \right. \right. \\
& \left. \left. + 324 e^{\frac{2(2x e^{2x} + e^{2x} - 2e^x - 2x - 1)}{e^{2x}-1}} + 32 e^{2x} - 64 e^x - 81 e^{\frac{2(e^{2x}-2e^x-1)}{e^{2x}-1} + 16} \right) \right)
\end{aligned}$$

$$\begin{aligned}
& "mean and variance", 162 \left(\int_0^{\ln(1+\sqrt{2})} \left(x (4 \sinh(x) + 1) e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} \cosh(x) \sinh(x)^2 \right) \Big/ (32 \sinh(x) \cosh(x)^4 \right. \\
& \left. + 80 \cosh(x)^4 + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41) \, dx \right), 162 \left(\right.
\end{aligned}$$

$$\begin{aligned}
& \left. \int_0^{\ln(1+\sqrt{2})} \left(x^2 (4 \sinh(x) + 1) e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} \cosh(x) \sinh(x)^2 \right) \Big/ (32 \sinh(x) \cosh(x)^4 \right.
\end{aligned}$$

$$+ 80 \cosh(x)^4 + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41) \, dx \Big) \\ - 26244$$

$$\left. \int_0^{\ln(1+\sqrt{2})} \left(x (4 \sinh(x) + 1) e^{\frac{2 (\sinh(x) - 1)}{\sinh(x)}} \cosh(x) \sinh(x)^2 \right) \Big/ (32 \sinh(x) \cosh(x)^4)^2 \right. \\ + 80 \cosh(x)^4 + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41) \, dx \Big)$$

"MF",

$$\left. \int_0^{\ln(1+\sqrt{2})} \left(162 x^{\sim} (4 \sinh(x) + 1) e^{\frac{2 (\sinh(x) - 1)}{\sinh(x)}} \cosh(x) \sinh(x)^2 \right) \Big/ (32 \sinh(x) \cosh(x)^4) \right. \\ + 80 \cosh(x)^4 + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41) \, dx$$

"MGF", 162

$$\left. \int_0^{\ln(1+\sqrt{2})} \left(e^{\frac{tx \sinh(x) + 2 \sinh(x) - 2}{\sinh(x)}} \sinh(x)^2 \cosh(x) (4 \sinh(x) + 1) \right) \Big/ (32 \sinh(x) \cosh(x)^4) \right. \\ + 80 \cosh(x)^4 + 16 \sinh(x) \cosh(x)^2 - 120 \cosh(x)^2 - 38 \sinh(x) + 41) \, dx \Big)$$

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

variable, $\ln(1 + \sqrt{2})$

Resetting high to RV's maximum support value

WARNING(PlotDist): High value provided by user, 40

is greater than maximum support value of the random variable, $\ln(1 + \sqrt{2})$

Resetting high to RV's maximum support value

```
162\,{\frac { \left( 4\,\sinh \left( x \right) +1 \right) \cosh \left( x \right) \left( \sinh \left( x \right) \left( \cosh \left( x \right) \right) ^{4}+80 \right. \\ \left. \left( \cosh \left( x \right) \right) ^{4}+16 \right) \sinh \left( x \right) \left( \cosh \left( x \right) \right) ^{4}+38 \right) ^{2}-120\,,\\ \left( \cosh \left( x \right) \right) ^{2}-38\,,\sinh \left( x \right) +41\} \\ \{{\rm e}^2\,{\frac {\sinh \left( x \right) -1}{\sinh \left( x \right) }}\} \\ "i is",16,
```

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \mapsto \frac{162 \left(4 + \operatorname{arctanh} \left(\frac{1}{y} \right) \right) e^{2 - 2 \operatorname{arctanh} \left(\frac{1}{y} \right)}}{\left(2 + \operatorname{arctanh} \left(\frac{1}{y} \right) \right)^5 (y^2 - 1)} \right], \left[1, \frac{e + e^{-1}}{e - e^{-1}} \right], \left["Continuous", "PDF" \right] \right]$$

"l and u", 0, ∞

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

$$"f(x)", \frac{162 \left(4 + \operatorname{arctanh} \left(\frac{1}{x} \right) \right) e^{2 - 2 \operatorname{arctanh} \left(\frac{1}{x} \right)}}{\left(2 + \operatorname{arctanh} \left(\frac{1}{x} \right) \right)^5 (x^2 - 1)}$$

$$"F(x)", \frac{(1296 (x-1) e^2)}{(256 + 256 x - 192 \ln(x+1) \ln(x-1) x - 48 \ln(x+1)^2 \ln(x-1) x + 48 \ln(x+1) \ln(x-1)^2 x - 4 \ln(x+1)^3 \ln(x-1) x + 6 \ln(x+1)^2 \ln(x-1)^2 x - 4 \ln(x+1) \ln(x-1)^3 x + 256 \ln(x+1) - 256 \ln(x-1) + 16 \ln(x+1)^3)}{x}$$

$$\begin{aligned}
& -16 \ln(x-1)^3 + \ln(x+1)^4 + \ln(x-1)^4 + 96 \ln(x+1)^2 + 96 \ln(x-1)^2 - 48 \ln(x+1)^2 \ln(x-1) + 48 \ln(x+1) \ln(x-1)^2 - 4 \ln(x+1)^3 \ln(x-1) + 6 \ln(x+1)^2 \ln(x-1)^2 - 4 \ln(x+1) \ln(x-1)^3 + 256 \ln(x+1) x - 256 \ln(x-1) x \\
& + 16 \ln(x+1)^3 x - 16 \ln(x-1)^3 x + \ln(x+1)^4 x + \ln(x-1)^4 x + 96 \ln(x+1)^2 x \\
& + 96 \ln(x-1)^2 x - 192 \ln(x+1) \ln(x-1) \\
& \quad "IDF(x)", [[], [0, 1], ["Continuous", "IDF"]]] \\
"S(x)", & -(-256 - 256 x + 192 \ln(x+1) \ln(x-1) x + 48 \ln(x+1)^2 \ln(x-1) x - 48 \ln(x+1) \ln(x-1)^2 x + 4 \ln(x+1)^3 \ln(x-1) x - 6 \ln(x+1)^2 \ln(x-1)^2 x + 4 \ln(x+1) \ln(x-1)^3 x - 256 \ln(x+1) + 256 \ln(x-1) - 16 \ln(x+1)^3 + 16 \ln(x-1)^3 \\
& - \ln(x+1)^4 - \ln(x-1)^4 - 96 \ln(x+1)^2 - 96 \ln(x-1)^2 - 1296 e^2 + 1296 e^2 x \\
& + 48 \ln(x+1)^2 \ln(x-1) - 48 \ln(x+1) \ln(x-1)^2 + 4 \ln(x+1)^3 \ln(x-1) \\
& - 6 \ln(x+1)^2 \ln(x-1)^2 + 4 \ln(x+1) \ln(x-1)^3 - 256 \ln(x+1) x + 256 \ln(x-1) x \\
& - 16 \ln(x+1)^3 x + 16 \ln(x-1)^3 x - \ln(x+1)^4 x - \ln(x-1)^4 x - 96 \ln(x+1)^2 x \\
& - 96 \ln(x-1)^2 x + 192 \ln(x+1) \ln(x-1)) / (256 + 256 x - 192 \ln(x+1) \ln(x-1) x \\
& - 48 \ln(x+1)^2 \ln(x-1) x + 48 \ln(x+1) \ln(x-1)^2 x - 4 \ln(x+1)^3 \ln(x-1) x \\
& + 6 \ln(x+1)^2 \ln(x-1)^2 x - 4 \ln(x+1) \ln(x-1)^3 x + 256 \ln(x+1) - 256 \ln(x-1) \\
& + 16 \ln(x+1)^3 - 16 \ln(x-1)^3 + \ln(x+1)^4 + \ln(x-1)^4 + 96 \ln(x+1)^2 + 96 \ln(x-1)^2 - 48 \ln(x+1)^2 \ln(x-1) + 48 \ln(x+1) \ln(x-1)^2 - 4 \ln(x+1)^3 \ln(x-1) \\
& + 6 \ln(x+1)^2 \ln(x-1)^2 - 4 \ln(x+1) \ln(x-1)^3 + 256 \ln(x+1) x - 256 \ln(x-1) x \\
& + 16 \ln(x+1)^3 x - 16 \ln(x-1)^3 x + \ln(x+1)^4 x + \ln(x-1)^4 x + 96 \ln(x+1)^2 x \\
& + 96 \ln(x-1)^2 x - 192 \ln(x+1) \ln(x-1)) \\
"h(x)", & \left(162 (\ln(x+1)^4 - 4 \ln(x+1)^3 \ln(x-1) + 6 \ln(x+1)^2 \ln(x-1)^2 - 4 \ln(x+1) \ln(x-1)^3 + \ln(x-1)^4 + 16 \ln(x+1)^3 - 48 \ln(x+1)^2 \ln(x-1) + 48 \ln(x+1) \ln(x-1)^2 - 16 \ln(x-1)^3 + 96 \ln(x+1)^2 - 192 \ln(x+1) \ln(x-1) + 96 \ln(x-1)^2 + 256 \ln(x+1) - 256 \ln(x-1) + 256) e^{2 - 2 \operatorname{arctanh}\left(\frac{1}{x}\right)} \left(4 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right) \right) / \\
& \left((256 + 256 x - 192 \ln(x+1) \ln(x-1) x - 48 \ln(x+1)^2 \ln(x-1) x + 48 \ln(x+1) \ln(x-1)^2 x - 4 \ln(x+1)^3 \ln(x-1) x + 6 \ln(x+1)^2 \ln(x-1)^2 x - 4 \ln(x+1) \ln(x-1)^3 x + 256 \ln(x+1) - 256 \ln(x-1) + 16 \ln(x+1)^3 - 16 \ln(x-1)^3 \right.
\end{aligned}$$

$$\begin{aligned}
& + \ln(x+1)^4 + \ln(x-1)^4 + 96 \ln(x+1)^2 + 96 \ln(x-1)^2 + 1296 e^2 - 1296 e^2 x \\
& - 48 \ln(x+1)^2 \ln(x-1) + 48 \ln(x+1) \ln(x-1)^2 - 4 \ln(x+1)^3 \ln(x-1) \\
& + 6 \ln(x+1)^2 \ln(x-1)^2 - 4 \ln(x+1) \ln(x-1)^3 + 256 \ln(x+1) x - 256 \ln(x-1) x \\
& + 16 \ln(x+1)^3 x - 16 \ln(x-1)^3 x + \ln(x+1)^4 x + \ln(x-1)^4 x + 96 \ln(x+1)^2 x \\
& + 96 \ln(x-1)^2 x - 192 \ln(x+1) \ln(x-1) (x-1) \left(2 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right)^5 \\
& \text{"mean and variance", 162} \left[\int_1^{\frac{e^2+1}{e^2-1}} \frac{x \left(4 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right) e^{2-2 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right)^5 (x^2-1)} dx \right], 162 \left[\right. \\
& \left. \int_1^{\frac{e^2+1}{e^2-1}} \frac{x^2 \left(4 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right) e^{2-2 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right)^5 (x^2-1)} dx \right] \\
& - 26244 \left[\int_1^{\frac{e^2+1}{e^2-1}} \frac{x \left(4 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right) e^{2-2 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right)^5 (x^2-1)} dx \right]^2 \\
& \text{"MF",} \left[\int_1^{\frac{e+e^{-1}}{e-e^{-1}}} \frac{162 x^{\sim} \left(4 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right) e^{2-2 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arctanh}\left(\frac{1}{x}\right) \right)^5 (x^2-1)} dx \right]
\end{aligned}$$

$$\text{"MGF", 162} \left(\int_1^{\frac{x^2+1}{x^2-1}} \frac{\left(4 + \operatorname{arctanh}\left(\frac{1}{x}\right)\right) e^{tx+2-2\operatorname{arctanh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arctanh}\left(\frac{1}{x}\right)\right)^5 (x^2-1)} dx \right)$$

WARNING(PlotDist): Low value provided by user, 0 is less than minimum support value of random variable

1

Resetting low to RV's minimum support value

WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random

$$\text{variable, } \frac{e+e^{-1}}{e-e^{-1}}$$

Resetting high to RV's maximum support value

WARNING(PlotDist): Low value provided by user, 0 is less than minimum support value of random variable

1

Resetting low to RV's minimum support value

WARNING(PlotDist): High value provided by user, 40 is greater than maximum support value of the random

$$\text{variable, } \frac{e+e^{-1}}{e-e^{-1}}$$

Resetting high to RV's maximum support value

```
162, {\frac { \left( 4+\operatorname{arctanh}\left( {x}^{-1}\right) \right) {e}^{2-2\operatorname{arctanh}\left( {x}^{-1}\right) }}{ \left( 2+\operatorname{arctanh}\left( {x}^{-1}\right) \right) ^5 \left( {x}^2-1 \right) }}\\
"i is", 17,
```

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \mapsto \frac{162 \left(4 + \operatorname{arcsinh}\left(\frac{1}{y}\right)\right) e^{2-2\operatorname{arcsinh}\left(\frac{1}{y}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{y}\right)\right)^5 \sqrt{y^2+1}} \right], \left[0, \frac{2}{e-e^{-1}} \right], \text{"Continuous"}, \right]$$

"PDF"]

"l and u", 0, ∞

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

$$\text{"f(x)"}, \frac{162 \left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{2 - 2 \operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)^5 \sqrt{x^2 + 1} |x|}$$

$$\text{"F(x)"}, 162 \left(\int_0^x \frac{\left(4 + \operatorname{arcsinh}\left(\frac{1}{t}\right)\right) e^{2 - 2 \operatorname{arcsinh}\left(\frac{1}{t}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{t}\right)\right)^5 \sqrt{t^2 + 1} |t|} dt \right)$$

$$\text{"S(x)"}, 1 - 162 \left(\int_0^x \frac{\left(4 + \operatorname{arcsinh}\left(\frac{1}{t}\right)\right) e^{2 - 2 \operatorname{arcsinh}\left(\frac{1}{t}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{t}\right)\right)^5 \sqrt{t^2 + 1} |t|} dt \right)$$

"h(x)",

$$\begin{aligned} & - \left(162 \left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{2 - 2 \operatorname{arcsinh}\left(\frac{1}{x}\right)} \right) \left(2 \right. \\ & + \left. \operatorname{arcsinh}\left(\frac{1}{x}\right) \right)^5 \sqrt{x^2 + 1} |x| \left(-1 + 162 \left(\int_0^x \frac{\left(4 + \operatorname{arcsinh}\left(\frac{1}{t}\right)\right) e^{2 - 2 \operatorname{arcsinh}\left(\frac{1}{t}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{t}\right)\right)^5 \sqrt{t^2 + 1} |t|} dt \right) \right) \right) \end{aligned}$$

"mean and variance", 162
$$\left[\int_0^{\frac{2e}{e^2-1}} \frac{\left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)^5 \sqrt{x^2+1}} dx \right], 162$$

$$\left[\int_0^{\frac{2e}{e^2-1}} \frac{x \left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)^5 \sqrt{x^2+1}} dx \right]$$

$$-26244 \left[\int_0^{\frac{2e}{e^2-1}} \frac{\left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)^5 \sqrt{x^2+1}} dx \right]^2$$

"MF",
$$\int_0^{\frac{2}{e-e^{-1}}} \frac{162 x^r \left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)^5 \sqrt{x^2+1} |x|} dx$$

"MGF", 162
$$\left[\int_0^{\frac{2e}{e^2-1}} \frac{\left(4 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right) e^{tx+2-2\operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\left(2 + \operatorname{arcsinh}\left(\frac{1}{x}\right)\right)^5 \sqrt{x^2+1} x} dx \right]$$

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

$$\text{variable, } \frac{2}{e-e^{-1}}$$

Resetting high to RV's maximum support value

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

$$\text{variable, } \frac{2}{e-e^{-1}}$$

Resetting high to RV's maximum support value

162\, , {\frac { \left(4+\operatorname{arcsinh} \left({x}^{-1} \right) \right) {e}^{2-2\operatorname{arcsinh} \left({x}^{-1} \right) }}{ \left(2+\operatorname{arcsinh} \left({x}^{-1} \right) \right) ^5 \sqrt {{x}^2+1}}}}

$$\begin{aligned}
& \text{"h(x)"}, \left(162 \left(4 + \sinh\left(\frac{1}{x}\right) \right) e^{2 - 2 \sinh\left(\frac{1}{x}\right)} \cosh\left(\frac{1}{x}\right) \left(e^{\frac{8}{x}} + 16 e^{\frac{7}{x}} + 92 e^{\frac{6}{x}} + 208 e^{\frac{5}{x}} \right. \right. \\
& \left. \left. + 70 e^{\frac{4}{x}} - 208 e^{\frac{3}{x}} + 92 e^{\frac{2}{x}} - 16 e^{\frac{1}{x}} + 1 \right) \right) \Bigg/ \left(x^2 \left(\sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^4 \right. \right. \\
& \left. \left. + 10 \cosh\left(\frac{1}{x}\right)^4 + 38 \sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^2 + 60 \cosh\left(\frac{1}{x}\right)^2 + 41 \sinh\left(\frac{1}{x}\right) - 38 \right) \right. \\
& \left(e^{\frac{8}{x}} + 16 e^{\frac{7}{x}} + 92 e^{\frac{6}{x}} + 208 e^{\frac{5}{x}} + 70 e^{\frac{4}{x}} - 208 e^{\frac{3}{x}} + 92 e^{\frac{2}{x}} - 16 e^{\frac{1}{x}} \right. \\
& \left. \left. - \frac{\left(\frac{2}{e^x} x - 2 e^x x - 4 e^x - x \right) e^{-\frac{1}{x}}}{x} \right) \right) \\
& - 1296 e^{\frac{1}{x}} \Bigg) \\
& \text{"mean and variance"}, 162 \left(\int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(\left(4 + \sinh\left(\frac{1}{x}\right) \right) e^{2 - 2 \sinh\left(\frac{1}{x}\right)} \cosh\left(\frac{1}{x}\right) \right) \right. \\
& \left. \left(x \left(\sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^4 + 10 \cosh\left(\frac{1}{x}\right)^4 + 38 \sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^2 + 60 \cosh\left(\frac{1}{x}\right)^2 \right. \right. \\
& \left. \left. + 41 \sinh\left(\frac{1}{x}\right) - 38 \right) \right) dx \Bigg), 162 \left(\int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(\left(4 \right. \right. \right. \\
& \left. \left. \left. + \sinh\left(\frac{1}{x}\right) \right) e^{2 - 2 \sinh\left(\frac{1}{x}\right)} \cosh\left(\frac{1}{x}\right) \right) \right) \Bigg/ \left(\sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^4 + 10 \cosh\left(\frac{1}{x}\right)^4 \right. \\
& \left. \left. + 38 \sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^2 + 60 \cosh\left(\frac{1}{x}\right)^2 + 41 \sinh\left(\frac{1}{x}\right) - 38 \right) dx \right) \\
& - 26244 \\
& \left(\int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(\left(4 + \sinh\left(\frac{1}{x}\right) \right) e^{2 - 2 \sinh\left(\frac{1}{x}\right)} \cosh\left(\frac{1}{x}\right) \right) \right) \Bigg/ \\
& \left(x \left(\sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^4 + 10 \cosh\left(\frac{1}{x}\right)^4 + 38 \sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^2 + 60 \cosh\left(\frac{1}{x}\right)^2 \right. \right. \\
& \left. \left. + 41 \sinh\left(\frac{1}{x}\right) - 38 \right) \right) dx \Bigg)
\end{aligned}$$

$$\begin{aligned}
& \text{"MF", } \int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(162 x^{\sim} \left(4 + \sinh\left(\frac{1}{x}\right) \right) e^{2 - 2 \sinh\left(\frac{1}{x}\right)} \cosh\left(\frac{1}{x}\right) \right) / \\
& \quad \left(x^2 \left(\sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^4 + 10 \cosh\left(\frac{1}{x}\right)^4 + 38 \sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^2 + 60 \cosh\left(\frac{1}{x}\right)^2 \right. \right. \\
& \quad \left. \left. + 41 \sinh\left(\frac{1}{x}\right) - 38 \right) \right) dx \\
& \text{"MGF", } 162 \left(\int_0^{\frac{1}{\ln(1+\sqrt{2})}} \left(\left(4 + \sinh\left(\frac{1}{x}\right) \right) \cosh\left(\frac{1}{x}\right) e^{tx + 2 - 2 \sinh\left(\frac{1}{x}\right)} \right) / \right. \\
& \quad \left. \left(x^2 \left(\sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^4 + 10 \cosh\left(\frac{1}{x}\right)^4 + 38 \sinh\left(\frac{1}{x}\right) \cosh\left(\frac{1}{x}\right)^2 + 60 \cosh\left(\frac{1}{x}\right)^2 \right. \right. \\
& \quad \left. \left. + 41 \sinh\left(\frac{1}{x}\right) - 38 \right) \right) dx \right)
\end{aligned}$$

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

$$\text{variable, } \frac{1}{\ln(1+\sqrt{2})}$$

Resetting high to RV's maximum support value

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random*

$$\text{variable, } \frac{1}{\ln(1+\sqrt{2})}$$

Resetting high to RV's maximum support value

```

162\, , {\frac { \left( 4+\sinh \left( {x}^{-1} \right) \right) \cosh \left( {x}^{-1} \right) \left( {x}^2 \sinh \left( {x}^{-1} \right) \cosh \left( {x}^{-1} \right)^4+10 \cosh \left( {x}^{-1} \right)^4+38 \sinh \left( {x}^{-1} \right) \cosh \left( {x}^{-1} \right)^2+60 \cosh \left( {x}^{-1} \right)^2+41 \sinh \left( {x}^{-1} \right) -38 \right) }{ \left( 4+\sinh \left( {x}^{-1} \right) \right) \cosh \left( {x}^{-1} \right) e^{tx+2-2\sinh \left( {x}^{-1} \right) }}}
"i is", 19,
" -----

```

$$g := t \mapsto \frac{1}{\text{csch}(t)} + 1$$

$l := 0$

$$\begin{aligned}
Temp := & \left[\left[y \sim \right. \right. \\
& \rightarrow \left. \left. \frac{162 \left(\operatorname{arccsch} \left(\frac{1}{y \sim - 1} \right) + 5 \right)}{\left(\operatorname{arccsch} \left(\frac{1}{y \sim - 1} \right) + 3 \right)^5 \sqrt{y \sim^2 - 2 y \sim + 2} \left(y \sim - 1 + \sqrt{y \sim^2 - 2 y \sim + 2} \right)^2} \right], [1, \right. \\
& \left. \left. \infty \right], \left[\text{"Continuous", "PDF"} \right] \right] \\
& \text{"1 and u", 0, } \infty \\
& \text{"g(x)", } \frac{1}{\operatorname{csch}(x)} + 1, \text{"base", } \frac{\left(2 + \frac{4}{x + 3} \right) e^{-2x}}{\left(1 + \frac{1}{3} x \right)^4}, \text{"GeneralizedParetoRV(2,3,4)"} \\
& \text{"f(x)", } \frac{162 \left(\operatorname{arccsch} \left(\frac{1}{x - 1} \right) + 5 \right)}{\left(\operatorname{arccsch} \left(\frac{1}{x - 1} \right) + 3 \right)^5 \sqrt{x^2 - 2x + 2} \left(x - 1 + \sqrt{x^2 - 2x + 2} \right)^2} \\
& \text{"F(x)", } 162 \left(\int_1^x \frac{\operatorname{arccsch} \left(\frac{1}{t - 1} \right) + 5}{\left(\operatorname{arccsch} \left(\frac{1}{t - 1} \right) + 3 \right)^5 \sqrt{t^2 - 2t + 2} \left(t - 1 + \sqrt{t^2 - 2t + 2} \right)^2} dt \right) \\
& \text{"S(x)", } 1 - 162 \left(\int_1^x \frac{\operatorname{arccsch} \left(\frac{1}{t - 1} \right) + 5}{\left(\operatorname{arccsch} \left(\frac{1}{t - 1} \right) + 3 \right)^5 \sqrt{t^2 - 2t + 2} \left(t - 1 + \sqrt{t^2 - 2t + 2} \right)^2} dt \right) \\
& \text{"h(x)", } - \left(162 \left(\operatorname{arccsch} \left(\frac{1}{x - 1} \right) + 5 \right) \right) \left(\operatorname{arccsch} \left(\frac{1}{x - 1} \right) + 3 \right)^5 \sqrt{x^2 - 2x + 2} \left(x - 1 + \sqrt{x^2 - 2x + 2} \right)^2 \left(-1 + 162 \left(\operatorname{arccsch} \left(\frac{1}{x - 1} \right) + 3 \right)^5 \sqrt{x^2 - 2x + 2} \right)
\end{aligned}$$

"i is", 20,

—
—

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \rightarrow -\frac{162 (1 + 5 \operatorname{arctanh}(y)) \operatorname{arctanh}(y)^2 e^{-\frac{2}{\operatorname{arctanh}(y)}}}{(1 + 3 \operatorname{arctanh}(y))^5 (y^2 - 1)} \right], [0, 1], \right. \\ \left. \left[\text{"Continuous", "PDF"} \right] \right]$$

"l and u", 0, ∞
 $"g(x)", \tanh\left(\frac{1}{x}\right), "base", \frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}, "GeneralizedParetoRV(2,3,4)"$

$$"f(x)", -\frac{162 (1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{-\frac{2}{\operatorname{arctanh}(x)}}}{(1 + 3 \operatorname{arctanh}(x))^5 (x^2 - 1)}$$

$$\text{"F(x)"}, -162 \left(\int_0^x \frac{(1 + 5 \operatorname{arctanh}(t)) \operatorname{arctanh}(t)^2 e^{-\frac{2}{\operatorname{arctanh}(t)}}}{(1 + 3 \operatorname{arctanh}(t))^5 (t^2 - 1)} dt \right)$$

$$\text{"S(x)"}, 1 + 162 \left(\int_0^x \frac{(1 + 5 \operatorname{arctanh}(t)) \operatorname{arctanh}(t)^2 e^{-\frac{2}{\operatorname{arctanh}(t)}}}{(1 + 3 \operatorname{arctanh}(t))^5 (t^2 - 1)} dt \right)$$

" $h(x)$ ",

$$\begin{aligned}
 & - \left(162 (1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{-\frac{2}{\operatorname{arctanh}(x)}} \right) \\
 & - 1) \left(1 + 162 \left(\int_0^x \frac{(1 + 5 \operatorname{arctanh}(t)) \operatorname{arctanh}(t)^2 e^{-\frac{2}{\operatorname{arctanh}(t)}}}{(1 + 3 \operatorname{arctanh}(t))^5 (t^2 - 1)} dt \right) \right)
 \end{aligned}$$

"mean and variance", $-162 \left(\int_0^1 \frac{x (1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{-\frac{2}{\operatorname{arctanh}(x)}}}{(1 + 3 \operatorname{arctanh}(x))^5 (x^2 - 1)} dx \right)$, $-162 \left(\int_0^1 \frac{x^2 (1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{-\frac{2}{\operatorname{arctanh}(x)}}}{(1 + 3 \operatorname{arctanh}(x))^5 (x^2 - 1)} dx \right)$

$-26244 \left(\int_0^1 \frac{x (1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{-\frac{2}{\operatorname{arctanh}(x)}}}{(1 + 3 \operatorname{arctanh}(x))^5 (x^2 - 1)} dx \right)^2$

"MF", $\int_0^1 \left(-\frac{162 x^r (1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{-\frac{2}{\operatorname{arctanh}(x)}}}{(1 + 3 \operatorname{arctanh}(x))^5 (x^2 - 1)} \right) dx$

"MGF", $-162 \left(\int_0^1 \frac{(1 + 5 \operatorname{arctanh}(x)) \operatorname{arctanh}(x)^2 e^{\frac{tx \operatorname{arctanh}(x) - 2}{\operatorname{arctanh}(x)}}}{(1 + 3 \operatorname{arctanh}(x))^5 (x^2 - 1)} dx \right)$

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random
variable, 1*

Resetting high to RV's maximum support value

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random
variable, 1*

Resetting high to RV's maximum support value

```
-162, {\frac { \left( 1+5 \right) \operatorname{arctanh} \left( x \right) \operatorname{arctanh}^2 \left( x \right) {e}^{-\frac {2}{\operatorname{arctanh} \left( x \right) }}}{ \left( 1+3 \right) ^5 \operatorname{arctanh}^5 \left( x \right) \left( {x}^2-1 \right) }}^2
\left( 1+5 \right) \operatorname{arctanh} \left( x \right) \operatorname{arctanh}^2 \left( x \right) {e}^{-\frac {2}{\operatorname{arctanh} \left( x \right) }}\right) ^2
\left( 1+5 \right) \operatorname{arctanh} \left( x \right) \operatorname{arctanh}^2 \left( x \right) {e}^{-\frac {2}{\operatorname{arctanh} \left( x \right) }}\right) ^2
\left( 1+5 \right) \operatorname{arctanh} \left( x \right) \operatorname{arctanh}^2 \left( x \right) {e}^{-\frac {2}{\operatorname{arctanh} \left( x \right) }}\right) ^2
```

"i is", 21,

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

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \rightarrow \frac{162 (1 + 5 \operatorname{arccsch}(y)) e^{-\frac{2}{\operatorname{arccsch}(y)}} \operatorname{arccsch}(y)^2}{(1 + 3 \operatorname{arccsch}(y))^5 \sqrt{y^2 + 1} |y|} \right], [0, \infty], \right]$$

["Continuous", "PDF"]

"l and u", 0, ∞

$$\text{"g(x)"}, \operatorname{csch}\left(\frac{1}{x}\right), \text{"base"}, \frac{\left(2 + \frac{4}{x+3}\right) e^{-2x}}{\left(1 + \frac{1}{3}x\right)^4}, \text{"GeneralizedParetoRV(2,3,4)"}$$

$$\text{"f(x)"}, \frac{162 (1 + 5 \operatorname{arccsch}(x)) e^{-\frac{2}{\operatorname{arccsch}(x)}} \operatorname{arccsch}(x)^2}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1} |x|}$$

$$\text{"F(x)"}, 162 \left(\int_0^x \frac{(1 + 5 \operatorname{arccsch}(t)) e^{-\frac{2}{\operatorname{arccsch}(t)}} \operatorname{arccsch}(t)^2}{(1 + 3 \operatorname{arccsch}(t))^5 \sqrt{t^2 + 1} |t|} dt \right)$$

$$\text{"S(x)"}, 1 - 162 \left(\int_0^x \frac{(1 + 5 \operatorname{arccsch}(t)) e^{-\frac{2}{\operatorname{arccsch}(t)}} \operatorname{arccsch}(t)^2}{(1 + 3 \operatorname{arccsch}(t))^5 \sqrt{t^2 + 1} |t|} dt \right)$$

$$\text{"h(x)"}, - \left(162 (1 + 5 \operatorname{arccsch}(x)) e^{-\frac{2}{\operatorname{arccsch}(x)}} \operatorname{arccsch}(x)^2 \right) \quad \left(\begin{array}{l} \\ (1) \end{array} \right)$$

$$+ 3 \operatorname{arccsch}(x)^5 \sqrt{x^2 + 1} |x| \left(-1 + 162 \left(\int_0^x \frac{(1 + 5 \operatorname{arccsch}(t)) e^{-\frac{2}{\operatorname{arccsch}(t)}} \operatorname{arccsch}(t)^2}{(1 + 3 \operatorname{arccsch}(t))^5 \sqrt{t^2 + 1} |t|} dt \right) \right) \left(\begin{array}{l} \\ \\ \\ \end{array} \right)$$

"mean and variance",

$$\int_0^\infty \frac{162 (1 + 5 \operatorname{arccsch}(x)) e^{-\frac{2}{\operatorname{arccsch}(x)}} \operatorname{arccsch}(x)^2}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1}} dx,$$

$$\int_0^\infty \frac{162 x (1 + 5 \operatorname{arccsch}(x)) e^{-\frac{2}{\operatorname{arccsch}(x)}} \operatorname{arccsch}(x)^2}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1}} dx$$

$$-\left(\int_0^{\infty} \frac{\frac{162 (1 + 5 \operatorname{arccsch}(x)) e^{-\frac{2}{\operatorname{arccsch}(x)}} \operatorname{arccsch}(x)^2}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1}} dx \right)^2$$

 "MF",
$$\int_0^{\infty} \frac{\frac{162 x^r (1 + 5 \operatorname{arccsch}(x)) e^{-\frac{2}{\operatorname{arccsch}(x)}} \operatorname{arccsch}(x)^2}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1}} |x| dx$$

 "MGF",
$$\int_0^{\infty} \frac{\frac{162 (1 + 5 \operatorname{arccsch}(x)) \operatorname{arccsch}(x)^2 e^{\frac{tx \operatorname{arccsch}(x) - 2}{\operatorname{arccsch}(x)}}}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1}} x dx$$

$$162 \cdot \frac{\operatorname{arccsch}(x)^2 e^{-2}}{(1 + 3 \operatorname{arccsch}(x))^5 \sqrt{x^2 + 1}}$$

 "i is", 22,

 " -----

 -----"

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

$$l := 0$$

$$u := \infty$$

$$Temp := [[y \rightarrow (162 (\sinh(y) + 5) e^{-2 \sinh(y)} \cosh(y)) / (\cosh(y)^4 \sinh(y))$$

$$+ 15 \cosh(y)^4 + 88 \cosh(y)^2 \sinh(y) + 240 \cosh(y)^2 + 316 \sinh(y) - 12)], [0, \infty], ["Continuous", "PDF"]]$$

 "l and u", 0, \infty

"g(x)",
$$\operatorname{arccsch}\left(\frac{1}{x}\right)$$
, "base",
$$\frac{\left(2 + \frac{4}{x + 3}\right) e^{-2x}}{\left(1 + \frac{1}{3} x\right)^4}$$
, "GeneralizedParetoRV(2,3,4)"

"f(x)",
$$(162 (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x)) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4$$

$$+ 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12)$$

 "F(x)",
$$(e^{8x} + 24 e^{7x} + 212 e^{6x} + 792 e^{5x} + 870 e^{4x} - 1296 e^{(4x+1)e^{-x} - e^x} - 792 e^{3x}$$

$$+ 212 e^{2x} - 24 e^x + 1) / (e^{8x} + 24 e^{7x} + 212 e^{6x} + 792 e^{5x} + 870 e^{4x} - 792 e^{3x} + 212 e^{2x}$$

$$- 24 e^x + 1)$$

 "IDF(x)",
$$[s \rightarrow \operatorname{RootOf}(-e^{-Z} \ln(-(e^{2-Z} + 6 e^{-Z} - 1)^4 (s - 1)) - e^{2-Z} + 4 e^{-Z} \ln(2))]$$

$$\begin{aligned}
& + 4 e^{-Z} \ln(3) + 4 Z e^{-Z} + 1 \big) \big], [0, 1], ["Continuous", "IDF"] \big] \\
\text{"S(x)"}, & - \frac{1296 e^{(-e^{2x} + 4xe^x + 1)e^{-x}}}{-e^{8x} - 24e^{7x} - 212e^{6x} - 792e^{5x} - 870e^{4x} + 792e^{3x} - 212e^{2x} + 24e^x - 1} \\
\text{"h(x)"}, & \frac{1}{8} \left((\sinh(x) + 5) e^{(e^{2x} - 2 \sinh(x)e^x - 4xe^x - 1)e^{-x}} \cosh(x) (e^{8x} + 24e^{7x} + 212e^{6x} \right. \\
& \left. + 792e^{5x} + 870e^{4x} - 792e^{3x} + 212e^{2x} - 24e^x + 1) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12)
\end{aligned}$$

"mean and variance",

$$\begin{aligned}
& \int_0^\infty \left(162x (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx, \\
& \int_0^\infty \left(162x^2 (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx \\
& - \left(\int_0^\infty \left(162x (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \right. \\
& \left. + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx \right)^2
\end{aligned}$$

"MF",

$$\begin{aligned}
& \int_0^\infty \left(162x^r (\sinh(x) + 5) e^{-2 \sinh(x)} \cosh(x) \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx
\end{aligned}$$

"MGF",

$$\begin{aligned}
& \int_0^\infty \left(162 (\sinh(x) + 5) \cosh(x) e^{tx - 2 \sinh(x)} \right) / (\sinh(x) \cosh(x)^4 + 15 \cosh(x)^4 \\
& + 88 \sinh(x) \cosh(x)^2 + 240 \cosh(x)^2 + 316 \sinh(x) - 12) dx
\end{aligned}$$

```
162\,{\frac { \left( \sinh \left( x \right) +5 \right) ^{{{\rm e}}^{{-2}}}\sinh \left( x \right) \cosh \left( x \right) \left\{ \sinh \left( x \right) \right. \\ \left. \cosh \left( x \right) \right\} ^{15}, \left( \cosh \left( x \right) \right) ^{88},\sinh \left( x \right) \left( \cosh \left( x \right) \right) ^{240}, \left( \cosh \left( x \right) \right) ^{316},\sinh \left( x \right) -12}
```