

```
> 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 := HypoExponentialRV([1,2,3]);
  bfname := "HypoExponentialRV(1,2,3)";
    bf := [[z~→3 (e2z - 2 ez + 1) e-3z], [0, ∞], ["Continuous", "PDF"]]
      bfname := "HypoExponentialRV(1,2,3)" (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/HypoExponential.tex";

glist := [t → t2, 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 21 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 <> 16 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 <> 18 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 statements do not work with PlotDist yet
PlotDist(PDF(Temp), 0, 40);
PlotDist(HF(Temp), 0, 40);
latex(PDF(Temp,x));
#print("transforming with", [[x->g(x)],[0,infinity]]);
#X2 := Transform(bf, [[x->g(x)],[0,infinity]]);
#print("pdf of X2 = ", PDF(X2,x));
#print("pdf of Temp = ", PDF(Temp,x));
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(" $$F^{-1} = ");
if i <> 4 and i <> 14 and i <> 16 and i <> 21 then
  latex(IDF(Temp) [1]);
end if;
printf("$$");
printf("Survivor Function \n $$ S(x)=");
latex(SF(Temp, x));
printf("$$ Hazard Function \n $$ h(x)=");
latex(HF(Temp, x));
printf("$$");
if i <> 18 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 $$");
  latex(MGF(Temp) [1]);
  printf("$$");
#  latex(MGF(Temp) [1]);
end if;

writeto(terminal);

od;

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

```

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

$$l := 0$$

$$u := \infty$$

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

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

$$"g(x)", x^2, "base", 3 (e^{2x} - 2 e^x + 1) e^{-3x}, "HypoExponentialRV(1,2,3)"$$

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

$"F(x)"$, $(e^{3\sqrt{x}} - 3e^{2\sqrt{x}} + 3e^{\sqrt{x}} - 1) e^{-3\sqrt{x}}$
ERROR(IDF): Could not find the appropriate inverse
ERROR(IDF): Could not find the appropriate inverse
ERROR(IDF): Could not find the appropriate inverse
 $"IDF(x)"$, $[[], [0, 1], ["Continuous", "IDF"]]$
 $"S(x)"$, $3e^{-\sqrt{x}} - 3e^{-2\sqrt{x}} + e^{-3\sqrt{x}}$
 $"h(x)"$, $\frac{3}{2} \frac{e^{2\sqrt{x}} - 2e^{\sqrt{x}} + 1}{\sqrt{x} (3e^{2\sqrt{x}} - 3e^{\sqrt{x}} + 1)}$
 $"\text{mean and variance}"$, $\frac{85}{18}, \frac{14741}{324}$
 $"MF"$, $3(-1)^{-4r} \Gamma(1 + 2r) - 32^{-2r} \Gamma(1 + 2r) + 3^{-2r} \Gamma(1 + 2r)$
 $"MGF"$, $\lim_{x \rightarrow \infty} \left(-\frac{3}{2} \frac{1}{\sqrt{-t}} \left(\sqrt{\pi} \left(\operatorname{erf} \left(\frac{1}{2} \frac{2t\sqrt{x}-1}{\sqrt{-t}} \right) e^{\frac{2}{t}} + e^{\frac{2}{t}} \operatorname{erf} \left(\frac{1}{2\sqrt{-t}} \right) \right) - 2 \operatorname{erf} \left(\frac{t\sqrt{x}-1}{\sqrt{-t}} \right) e^{\frac{5}{4t}} - 2 \operatorname{erf} \left(\frac{1}{\sqrt{-t}} \right) e^{\frac{5}{4t}} + \operatorname{erf} \left(\frac{1}{2} \frac{2t\sqrt{x}-3}{\sqrt{-t}} \right) + \operatorname{erf} \left(\frac{3}{2\sqrt{-t}} \right) \right) e^{-\frac{9}{4t}} \right)$
 $3/2 \left(\frac{\operatorname{erf} \left(\frac{1}{2} \frac{2t\sqrt{x}-1}{\sqrt{-t}} \right) e^{\frac{2}{t}} + e^{\frac{2}{t}} \operatorname{erf} \left(\frac{1}{2\sqrt{-t}} \right)}{\sqrt{\pi}} - 2 \operatorname{erf} \left(\frac{t\sqrt{x}-1}{\sqrt{-t}} \right) e^{\frac{5}{4t}} - 2 \operatorname{erf} \left(\frac{1}{\sqrt{-t}} \right) e^{\frac{5}{4t}} + \operatorname{erf} \left(\frac{1}{2} \frac{2t\sqrt{x}-3}{\sqrt{-t}} \right) + \operatorname{erf} \left(\frac{3}{2\sqrt{-t}} \right) \right) e^{-\frac{9}{4t}}$
 $3/2 \left(\frac{\operatorname{erf} \left(\frac{1}{2} \frac{2t\sqrt{x}-1}{\sqrt{-t}} \right) e^{\frac{2}{t}} + e^{\frac{2}{t}} \operatorname{erf} \left(\frac{1}{2\sqrt{-t}} \right)}{\sqrt{\pi}} - 2 \operatorname{erf} \left(\frac{t\sqrt{x}-1}{\sqrt{-t}} \right) e^{\frac{5}{4t}} - 2 \operatorname{erf} \left(\frac{1}{\sqrt{-t}} \right) e^{\frac{5}{4t}} + \operatorname{erf} \left(\frac{1}{2} \frac{2t\sqrt{x}-3}{\sqrt{-t}} \right) + \operatorname{erf} \left(\frac{3}{2\sqrt{-t}} \right) \right) e^{-\frac{9}{4t}}$
 $"i \text{ is}"$, 2,
 $"$ -----
 $"$
 $g := t \rightarrow \sqrt{t}$
 $l := 0$
 $u := \infty$
 $Temp := [[y \rightarrow 6 (e^{2y^2} - 2e^{y^2} + 1) e^{-3y^2} y], [0, \infty], ["Continuous", "PDF"]]$
 $"l \text{ and } u"$, 0, ∞
 $"g(x)"$, \sqrt{x} , "base", 3 $(e^{2x} - 2e^x + 1) e^{-3x}$, "HypoExponentialRV(1,2,3)"
 $"f(x)"$, $6 (e^{2x^2} - 2e^{x^2} + 1) e^{-3x^2} x$
 $"F(x)"$, $(e^{3x^2} - 3e^{2x^2} + 3e^{x^2} - 1) e^{-3x^2}$
ERROR(IDF): Could not find the appropriate inverse
 $"IDF(x)"$, $[[], [0, 1], ["Continuous", "IDF"]]$

$$, [0, 1], ["Continuous", "IDF"] \Bigg]$$

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

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

$$"mean and variance", 6 \ln(2) - 3 \ln(3), -12 \ln(2) + 9 \ln(3) - (6 \ln(2) - 3 \ln(3))^2$$

$$"MF", 3 (-1)^{2r} \Gamma(1 - r) - 3 2^r \Gamma(1 - r) + 3^r \Gamma(1 - r)$$

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

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

$$"i is", 4,$$

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

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

$$l := 0$$

$$u := \infty$$

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

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

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

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

$$"F(x)", \begin{cases} \left(e^{3 \tan(x)} - 3 e^{2 \tan(x)} + 3 e^{\tan(x)} - 1 \right) e^{-3 \tan(x)} & x \leq \frac{1}{2} \pi \\ \infty & \frac{1}{2} \pi < x \end{cases}$$

$$"S(x)", \begin{cases} \left(3 e^{2 \tan(x)} - 3 e^{\tan(x)} + 1 \right) e^{-3 \tan(x)} & x \leq \frac{1}{2} \pi \\ -\infty & \frac{1}{2} \pi < x \end{cases}$$

$$\text{"h(x)"}, \begin{cases} \frac{3(e^{2\tan(x)} - 2e^{\tan(x)} + 1)(1 + \tan(x)^2)}{3e^{2\tan(x)} - 3e^{\tan(x)} + 1} & x \leq \frac{1}{2}\pi \\ 0 & \frac{1}{2}\pi < x \end{cases}$$

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

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

$$-9 \left(\int_0^{\frac{1}{2}\pi} \frac{x e^{-\frac{\sin(x)}{\cos(x)}} \left(-e^{-\frac{2\sin(x)}{\cos(x)}} + 2e^{-\frac{\sin(x)}{\cos(x)}} - 1 \right)}{\cos(x)^2} dx \right)^2$$

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

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

*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

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

" -----

-----"

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

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

"l and u", 0, ∞

"g(x)", e^x , "base", $3(e^{2x} - 2e^x + 1)e^{-3x}$, "HypoExponentialRV(1,2,3)"

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

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

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

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

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

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

"mean and variance", ∞ , *undefined*

$$\begin{aligned} "MF", \lim_{x \rightarrow \infty} \frac{1}{(r-1)(-2+r)(-3+r)} & (3(x^{-3+r}r^2x^2 - 2x^{-3+r}r^2x \\ & - 5x^{-3+r}r^2x^2 + r^2x^{-3+r} + 8x^{-3+r}r^2x + 6x^{-3+r}x^2 - 3r^2x^{-3+r} - 6x^{-3+r}x \\ & + 2x^{-3+r} - 2)) \end{aligned}$$

$$\begin{aligned} "MGF", \lim_{x \rightarrow \infty} \left(-\frac{1}{2} \frac{1}{x^3} & (Ei(1, -tx)t^3x^3 - Ei(1, -t)t^3x^3 - 6Ei(1, -tx)t^2x^3 + 6Ei(1, \right. \\ & \left. -t)t^2x^3 - e^t t^2 x^3 + 6Ei(1, -tx)t x^3 - 6Ei(1, -t)t x^3 + 5e^t t x^3 + e^{tx} t^2 x^2 - 2e^t x^3 \right. \\ & \left. - 6e^{tx} t x^2 + e^{tx} t x + 6e^{tx} x^2 - 6e^{tx} x + 2e^{tx}) \right) \end{aligned}$$

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

3\, , {\frac{\{{\it x}\}^2-2\,{\it x}+1\} \{{\it x}\}^4}}\}

"i is", 6,

"-----"

-----"

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

"g(x)", $\ln(x)$, "base", 3 $(e^{2x} - 2e^x + 1) e^{-3e^x}$, "HypoExponentialRV(1,2,3)"

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

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

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

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

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

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

"mean and variance", $\int_{-\infty}^{\infty} 3x \left(e^{2e^x} - 2e^{e^x} + 1 \right) e^{-3e^x + x} dx, \int_{-\infty}^{\infty} 3x^2 \left(e^{2e^x} - 2e^{e^x} + 1 \right) e^{-3e^x + x}$

$dx - \left(\int_{-\infty}^{\infty} 3x \left(e^{2e^x} - 2e^{e^x} + 1 \right) e^{-3e^x + x} dx \right)^2$

"MF", $\int_{-\infty}^{\infty} \left(-3x^2 \left(-e^{2e^x} + 2e^{e^x} - 1 \right) e^{-3e^x + x} \right) dx$

"MGF", $\int_{-\infty}^{\infty} 3 \left(e^{2e^x} - 2e^{e^x} + 1 \right) e^{tx - 3e^x + x} dx$

$-3, \left. \left(-\{ \{ \text{rm } e \}^2, \{ \{ \text{rm } e \}^x \} \} \right) \right) + 2, \{ \{ \text{rm } e \}^{\{ \{ \text{rm } e \}^x \}}$

$-1 \right) \{ \{ \text{rm } e \}^{-3}, \{ \{ \text{rm } e \}^x \} + x \}$

"i is", 7,

" -----"

-----"

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \sim \rightarrow 3y^2 - 6y + 3 \right], [0, 1], ["Continuous", "PDF"] \right]$$

"l and u", 0, ∞

"g(x)", e^{-x} , "base", 3 $(e^{2x} - 2e^x + 1) e^{-3e^x}$, "HypoExponentialRV(1,2,3)"

"f(x)", $3x^2 - 6x + 3$

"F(x)", $x^3 - 3x^2 + 3x$

ERROR(IDF): Could not find the appropriate inverse
 ERROR(IDF): Could not find the appropriate inverse
 ERROR(IDF): Could not find the appropriate inverse
 "IDF(x)", [[], [0, 1], ["Continuous", "IDF"]]
 "S(x)", $-x^3 + 3x^2 - 3x + 1$
 "h(x)", $-\frac{3}{x-1}$
 "mean and variance", $\frac{1}{4}, \frac{3}{80}$
 "MF", $\frac{6}{r^3 + 6r^2 + 11r + 6}$
 "MGF", $\frac{3(-t^2 + 2e^t - 2t - 2)}{t^3}$
 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
 $3 \setminus, \{x\}^{\{2\}} - 6 \setminus, x + 3$
 "i is", 8,
 "
 -----"
 $g := t \rightarrow -\ln(t)$
 $l := 0$
 $u := \infty$
 $Temp := \left[\left[y \rightarrow 3 \left(e^{2e^{-y}} - 2e^{e^{-y}} + 1 \right) e^{-3e^{-y} - y} \right], [-\infty, \infty], ["Continuous", "PDF"] \right]$
 "l and u", 0, ∞
 "g(x)", $-\ln(x)$, "base", $3 \left(e^{2x} - 2e^x + 1 \right) e^{-3x}$, "HypoExponentialRV(1,2,3)"
 "f(x)", $3 \left(e^{2e^{-x}} - 2e^{e^{-x}} + 1 \right) e^{-3e^{-x} - x}$
 "F(x)", $\left(3e^{2e^{-x}} - 3e^{e^{-x}} + 1 \right) e^{-3e^{-x}}$
 "IDF(x)", $\left[\left[s \rightarrow \ln(3) - \ln(-\ln(2) + 3 \ln \left(\frac{1}{((s-1)(\text{csgn}(s-1)s+s-2))^{1/3}s} \right) (-2^{2/3}s + ((s-1)(\text{csgn}(s-1)s+s-2))^{2/3} + ((s-1)(\text{csgn}(s-1)s+s-2))^{1/3}2^{1/3} + 2^{2/3})) \right], [0, 1], ["Continuous", "IDF"] \right]$
 "S(x)", $(e^{3e^{-x}} - 3e^{2e^{-x}} + 3e^{e^{-x}} - 1) e^{-3e^{-x}}$
 "h(x)", $\frac{3e^{-x}}{e^{e^{-x}} - 1}$

"mean and variance", 3

$$\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{2e^x} - 4 - 2e^{e^x} - 2 + 1 \right) e^{-\frac{3e^x x - 6x - 1}{x}} dx, 3 \left(\int_0^{\frac{1}{\ln(2)}} \left(e^{2e^x} - 4 - 2e^{e^x} - 2 + 1 \right) e^{-\frac{3e^x x - 6x - 1}{x}} dx \right)^2 - 9 \left(\int_0^{\frac{1}{\ln(2)}} \left(e^{2e^x} - 4 - 2e^{e^x} - 2 + 1 \right) e^{-\frac{3e^x x - 6x - 1}{x}} dx \right)^2$$

"MF",

$$\int_0^{\frac{1}{\ln(2)}} \frac{3x^r \left(e^{2e^x} - 4 - 2e^{e^x} - 2 + 1 \right) e^{-\frac{3e^x x - 6x - 1}{x}} dx$$

"MGF", 3

$$\int_0^{\frac{1}{\ln(2)}} \frac{\left(e^{2e^x} - 4 - 2e^{e^x} - 2 + 1 \right) e^{-\frac{-tx^2 + 3e^x x - 6x - 1}{x}} dx$$

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

-----"

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \rightarrow -\frac{6 \left(y^2 + \sqrt{-y^2 + 1} - 1 \right)}{(y - 1) (y + 1)^3} \right], [0, 1], ["Continuous", "PDF"] \right]$$

"l and u", 0, ∞

"g(x)", $\tanh(x)$, "base", $3 (e^{2x} - 2 e^x + 1) e^{-3x}$, "HypoExponentialRV(1,2,3)"

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

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

"IDF(x)", $\left[\left[s \rightarrow \left(2^{2/3} (s (\text{csgn}(s + 8) s^3 + 12 \text{csgn}(s + 8) s^2 + s^3 + 40 s \text{csgn}(s + 8) + 12 s^2 + 64 \text{csgn}(s + 8) + 56 s + 64))^{2/3} + 4 s^2 2^{1/3} - s^2 (s (\text{csgn}(s + 8) s^3 + 12 \text{csgn}(s + 8) s^2 + s^3 + 40 s \text{csgn}(s + 8) + 12 s^2 + 64 \text{csgn}(s + 8) + 56 s + 64))^{1/3} + 16 s 2^{1/3} \right) / \left((s (\text{csgn}(s + 8) s^3 + 12 \text{csgn}(s + 8) s^2 + s^3 + 40 s \text{csgn}(s + 8) + 12 s^2 + 64 \text{csgn}(s + 8) + 56 s + 64))^{1/3} (s^2 + 4 s + 8) \right) \right], [0, 1], ["Continuous", "IDF"] \right]$

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

$$"h(x)", -\frac{6 \left(x^2 + \sqrt{-x^2 + 1} - 1 \right)}{\left(2 \sqrt{-x^2 + 1} x + 3 x^2 + 4 \sqrt{-x^2 + 1} - 3 \right) (x^2 - 1)}$$

"mean and variance", $5 - 6 \ln(2)$, $-36 \ln(2)^2 + 3 \pi + 72 \ln(2) - 42$

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

$$"MGF", -6 \left(\int_0^1 \frac{e^{tx} \left(x^2 + \sqrt{-x^2 + 1} - 1 \right)}{(x - 1) (x + 1)^3} dx \right)$$

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

```

-6\, , {\frac{ \{{\it x}\}^2+\sqrt{ \{-{\it x}\}^2+1}-1}{ \left( {\it x}-1 \right) \left( {\it x}+1 \right) }}^{\, 3}\\
"i is", 12,

```

```

" -----
-----"
g := t→sinh(t)
l := 0
u := ∞
Temp := [ [y~→ $\frac{6 \left(y\sqrt{y^2+1}+y^2-\sqrt{y^2+1}-y+1\right)}{\left(y+\sqrt{y^2+1}\right)^3\sqrt{y^2+1}}$  ], [0, ∞], ["Continuous",
"PDF"] ]

```

"l and u", 0, ∞

"g(x)", sinh(x), "base", 3 (e^{2x} - 2 e^x + 1) e^{-3x}, "HypoExponentialRV(1,2,3)"

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

"F(x)", $4-4\sqrt{x^2+1}x^2-4\sqrt{x^2+1}+4x^3-6x\sqrt{x^2+1}+6x^2+6x$

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

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

"S(x)", $-3+4\sqrt{x^2+1}x^2+4\sqrt{x^2+1}-4x^3+6x\sqrt{x^2+1}-6x^2-6x$

"h(x)", $\left(6 \left(x\sqrt{x^2+1}+x^2-\sqrt{x^2+1}-x+1\right)\right) \bigg/ \left(\left(x+\sqrt{x^2+1}\right)^3\sqrt{x^2+1}\left(-3+4\sqrt{x^2+1}x^2+4\sqrt{x^2+1}-4x^3+6x\sqrt{x^2+1}-6x^2-6x\right)\right)$

"mean and variance", ∞, *undefined*

"MF", $\frac{18 \Gamma\left(\frac{1}{2}-\frac{1}{2} r\right) \Gamma\left(1+\frac{1}{2} r\right)}{\sqrt{\pi} \left(r+3\right) \left(5+r\right)}+\frac{9}{2} \frac{1}{\pi} \left(\frac{2}{3} \sqrt{\pi} \Gamma\left(\frac{3}{2}+\frac{1}{2} r\right) \Gamma\left(-\frac{1}{2} r\right.$

$\left.-1\right) \text{hypergeom}\left(\left[-\frac{3}{2}, \frac{3}{2}, \frac{3}{2}+\frac{1}{2} r\right], \left[\frac{1}{2}, 2+\frac{1}{2} r\right], 1\right)$

$-\frac{2 \Gamma\left(2+\frac{1}{2} r\right) \pi ^{3/2} \sec \left(\frac{1}{2} \pi r\right)}{\Gamma\left(\frac{5}{2}+\frac{1}{2} r\right)}+\frac{8}{3} \frac{\Gamma\left(3+\frac{1}{2} r\right) \pi ^{3/2} \sec \left(\frac{1}{2} \pi r\right)}{\Gamma\left(\frac{7}{2}+\frac{1}{2} r\right)}$

$$\begin{aligned}
& + \frac{1}{(r\sim + 3) (5 + r\sim)} \left(4 \sqrt{\pi} \Gamma\left(\frac{1}{2} - \frac{1}{2} r\sim\right) \Gamma\left(1 + \frac{1}{2} r\sim\right) \text{hypergeom}\left(\left[\frac{1}{2}, -\frac{5}{2} - \frac{1}{2} r\sim, \frac{1}{2} - \frac{1}{2} r\sim\right], \left[-\frac{1}{2} r\sim, -\frac{1}{2} r\sim - \frac{1}{2}\right], 1\right)\right) \\
& - \frac{18 \Gamma\left(-\frac{1}{2} r\sim + 1\right) \Gamma\left(\frac{1}{2} + \frac{1}{2} r\sim\right)}{\sqrt{\pi} (r\sim + 2) (4 + r\sim)} - \frac{9}{2} \frac{1}{\pi} \left(\frac{2}{3} \sqrt{\pi} \Gamma\left(1 + \frac{1}{2} r\sim\right) \Gamma\left(-\frac{1}{2} r\sim - \frac{1}{2}\right) \right. \\
& \left. - \frac{1}{2}\right) \text{hypergeom}\left(\left[-\frac{3}{2}, \frac{3}{2}, 1 + \frac{1}{2} r\sim\right], \left[\frac{1}{2}, \frac{3}{2} + \frac{1}{2} r\sim\right], 1\right) \\
& - \frac{2 \Gamma\left(\frac{3}{2} + \frac{1}{2} r\sim\right) \pi^{3/2} \csc\left(\frac{1}{2} \pi r\sim\right)}{\Gamma\left(2 + \frac{1}{2} r\sim\right)} + \frac{8}{3} \frac{\Gamma\left(\frac{5}{2} + \frac{1}{2} r\sim\right) \pi^{3/2} \csc\left(\frac{1}{2} \pi r\sim\right)}{\Gamma\left(3 + \frac{1}{2} r\sim\right)} \\
& + \frac{1}{(r\sim + 2) (4 + r\sim)} \left(4 \sqrt{\pi} \Gamma\left(-\frac{1}{2} r\sim + 1\right) \Gamma\left(\frac{1}{2} + \frac{1}{2} r\sim\right) \text{hypergeom}\left(\left[\frac{1}{2}, -2 - \frac{1}{2} r\sim, -\frac{1}{2} r\sim + 1\right], \left[-\frac{1}{2} r\sim, \frac{1}{2} - \frac{1}{2} r\sim\right], 1\right)\right) + \frac{9}{2} \frac{1}{\pi} \left(\frac{2}{3} \sqrt{\pi} \Gamma\left(\frac{1}{2} + \frac{1}{2} r\sim\right) \right. \\
& \left. + \frac{1}{2} r\sim\right) \Gamma\left(-\frac{1}{2} r\sim\right) \text{hypergeom}\left(\left[-\frac{3}{2}, \frac{3}{2}, \frac{1}{2} + \frac{1}{2} r\sim\right], \left[\frac{1}{2}, 1 + \frac{1}{2} r\sim\right], 1\right) \\
& + \frac{2 \Gamma\left(1 + \frac{1}{2} r\sim\right) \pi^{3/2} \sec\left(\frac{1}{2} \pi r\sim\right)}{\Gamma\left(\frac{3}{2} + \frac{1}{2} r\sim\right)} - \frac{8}{3} \frac{\Gamma\left(2 + \frac{1}{2} r\sim\right) \pi^{3/2} \sec\left(\frac{1}{2} \pi r\sim\right)}{\Gamma\left(\frac{5}{2} + \frac{1}{2} r\sim\right)} \\
& + \frac{1}{(1 + r\sim) (r\sim + 3)} \left(4 \sqrt{\pi} \Gamma\left(-\frac{1}{2} r\sim + \frac{3}{2}\right) \Gamma\left(\frac{1}{2} r\sim\right) \text{hypergeom}\left(\left[\frac{1}{2}, -\frac{3}{2} - \frac{1}{2} r\sim, -\frac{1}{2} r\sim + \frac{3}{2}\right], \left[-\frac{1}{2} r\sim + 1, \frac{1}{2} - \frac{1}{2} r\sim\right], 1\right)\right) \\
& \text{"MGF", } \int_0^{\infty} \frac{6 e^{tx} (x \sqrt{x^2 + 1} + x^2 - \sqrt{x^2 + 1} - x + 1)}{(x + \sqrt{x^2 + 1})^3 \sqrt{x^2 + 1}} dx \\
6\backslash, \{\backslash\frac{\backslash\{x\backslash\sqrt{\backslash\{x\}\backslash^{\{2\}\backslash+1\}\backslash+\{x\}\backslash^{\{2\}}}\backslash-\backslash\sqrt{\backslash\{x\}\backslash^{\{2\}\backslash+1\}\backslash-x\backslash+1\}}\backslash\left(\backslash x\right. \\
& + \backslash\sqrt{\backslash\{x\}\backslash^{\{2\}\backslash+1\}}\backslash\right)\backslash^{\{3\}}\backslash\sqrt{\backslash\{x\}\backslash^{\{2\}\backslash+1\}}\} \\
& \text{"i is", 13,} \\
& \text{"-----"} \\
& \text{"-----"} \\
& g := t \rightarrow \text{arcsinh}(t)
\end{aligned}$$

```

l := 0
u := infinity
Temp := [ [y~→3 (e^2 sinh(y~) - 2 e^sinh(y~) + 1) e^-3 sinh(y~) cosh(y~)], [0, infinity], ["Continuous",
"PDF"] ]

```

"l and u", 0, infinity

"g(x)", arcsinh(x), "base", 3 (e^2x - 2 e^x + 1) e^-3x, "HypoExponentialRV(1,2,3)"

"f(x)", 3 (e^2 sinh(x) - 2 e^sinh(x) + 1) e^-3 sinh(x) cosh(x)

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

ERROR(IDF): Could not find the appropriate inverse

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

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

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

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

"MF", $\int_0^\infty 3 x^r (e^2 \sinh(x) - 2 e^{\sinh(x)} + 1) e^{-3 \sinh(x)} \cosh(x) dx$

"MGF", $\int_0^\infty 3 (e^2 \sinh(x) - 2 e^{\sinh(x)} + 1) \cosh(x) e^{tx - 3 \sinh(x)} dx$

```

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

```

"i is", 14,

```

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

```

$g := t \rightarrow \text{csch}(t + 1)$
 $l := 0$

$$\begin{aligned}
& u := \infty \\
Temp := & \left[\left[y \sim \rightarrow \frac{3 (e^{-2+2 \operatorname{arccsch}(y)} - 2 e^{-1+\operatorname{arccsch}(y)} + 1) e^{3-3 \operatorname{arccsch}(y)}}{\sqrt{y^2+1} |y|} \right], \left[0, \frac{2}{e-e^{-1}} \right], \right. \\
& \left. ["\text{Continuous}", "PDF"] \right] \\
& "l \text{ and } u", 0, \infty \\
& "g(x)", \operatorname{csch}(x+1), "base", 3 (e^{2x} - 2 e^x + 1) e^{-3x}, "HypoExponentialRV(1,2,3)" \\
& "f(x)", \frac{3 (e^{-2+2 \operatorname{arccsch}(x)} - 2 e^{-1+\operatorname{arccsch}(x)} + 1) e^{3-3 \operatorname{arccsch}(x)}}{\sqrt{x^2+1} |x|} \\
& "F(x)", 3 \left(\int_0^x \frac{(e^{-2+2 \operatorname{arccsch}(t)} - 2 e^{-1+\operatorname{arccsch}(t)} + 1) e^{3-3 \operatorname{arccsch}(t)}}{\sqrt{t^2+1} |t|} dt \right) \\
& "S(x)", 1 - 3 \left(\int_0^x \frac{(e^{-2+2 \operatorname{arccsch}(t)} - 2 e^{-1+\operatorname{arccsch}(t)} + 1) e^{3-3 \operatorname{arccsch}(t)}}{\sqrt{t^2+1} |t|} dt \right) \\
& "h(x)", \\
& - \frac{3 (e^{-2+2 \operatorname{arccsch}(x)} - 2 e^{-1+\operatorname{arccsch}(x)} + 1) e^{3-3 \operatorname{arccsch}(x)}}{\sqrt{x^2+1} |x| \left(-1 + 3 \left(\int_0^x \frac{(e^{-2+2 \operatorname{arccsch}(t)} - 2 e^{-1+\operatorname{arccsch}(t)} + 1) e^{3-3 \operatorname{arccsch}(t)}}{\sqrt{t^2+1} |t|} dt \right) \right)} \\
& "mean \text{ and } variance", 3 \left(\int_0^{\frac{2e}{e^2-1}} \frac{(e^{-2+2 \operatorname{arccsch}(x)} - 2 e^{-1+\operatorname{arccsch}(x)} + 1) e^{3-3 \operatorname{arccsch}(x)}}{\sqrt{x^2+1}} dx \right), \\
& 3 \left(\int_0^{\frac{2e}{e^2-1}} \frac{x (e^{-2+2 \operatorname{arccsch}(x)} - 2 e^{-1+\operatorname{arccsch}(x)} + 1) e^{3-3 \operatorname{arccsch}(x)}}{\sqrt{x^2+1}} dx \right) \\
& - 9 \left(\int_0^{\frac{2e}{e^2-1}} \frac{(e^{-2+2 \operatorname{arccsch}(x)} - 2 e^{-1+\operatorname{arccsch}(x)} + 1) e^{3-3 \operatorname{arccsch}(x)}}{\sqrt{x^2+1}} dx \right)^2 \\
& "MF", \int_0^{\frac{2}{e-e^{-1}}} \frac{3 x' (e^{-2+2 \operatorname{arccsch}(x)} - 2 e^{-1+\operatorname{arccsch}(x)} + 1) e^{3-3 \operatorname{arccsch}(x)}}{\sqrt{x^2+1} |x|} dx
\end{aligned}$$

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

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

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

"i is", 15,

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

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

"g(x)", $\operatorname{arccsch}(x+1)$, "base", 3 $(e^{2x}-2 e^x+1) e^{-3x}$, "HypoExponentialRV(1,2,3)"

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

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

ERROR(IDF): Could not find the appropriate inverse

*ERROR(IDF): Could not find the appropriate inverse
 ERROR(IDF): Could not find the appropriate inverse*

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

$$\begin{aligned} & \frac{e^{2x} - 2e^x - 1}{e^{2x} - 1} + 3e^{\frac{2(e^{2x} - 2e^x - 1)}{e^{2x} - 1}} - e^{\frac{3(e^{2x} - 2e^x - 1)}{e^{2x} - 1}} + 1 \\ & "S(x)", -3e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} + 3e^{\frac{\sinh(x) - 1}{\sinh(x)}} - e^{\frac{\sinh(x) - 1}{\sinh(x)}} \cosh(x) \\ & "h(x)", -\frac{3 \left(e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} - 2e^{\frac{\sinh(x) - 1}{\sinh(x)}} + 1 \right) e^{\frac{\sinh(x) - 1}{\sinh(x)}} \cosh(x)}{\left(3e^{\frac{2(e^{2x} - 2e^x - 1)}{e^{2x} - 1}} - 3e^{\frac{2(e^{2x} - 2e^x - 1)}{e^{2x} - 1}} + e^{\frac{3(e^{2x} - 2e^x - 1)}{e^{2x} - 1}} - 1 \right) \sinh(x)^2} \end{aligned}$$

"mean and variance", 3 $\left(\begin{array}{l} \int_0^{\ln(1 + \sqrt{2})} x \left(e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} - 2e^{\frac{\sinh(x) - 1}{\sinh(x)}} + 1 \right) e^{\frac{\sinh(x) - 1}{\sinh(x)}} \cosh(x) dx, -3 \left(\begin{array}{l} \int_0^{\ln(1 + \sqrt{2})} x^2 \left(-e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} + 2e^{\frac{\sinh(x) - 1}{\sinh(x)}} - 1 \right) e^{\frac{\sinh(x) - 1}{\sinh(x)}} \cosh(x) dx \end{array} \right) \\ -9 \left(\int_0^{\ln(1 + \sqrt{2})} x \left(e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} - 2e^{\frac{\sinh(x) - 1}{\sinh(x)}} + 1 \right) e^{\frac{\sinh(x) - 1}{\sinh(x)}} \cosh(x) dx \right)^2 \\ "MF", \int_0^{\ln(1 + \sqrt{2})} \left(-\frac{3x^{r \sim} \left(-e^{\frac{2(\sinh(x) - 1)}{\sinh(x)}} + 2e^{\frac{\sinh(x) - 1}{\sinh(x)}} - 1 \right) e^{\frac{\sinh(x) - 1}{\sinh(x)}} \cosh(x)}{\sinh(x)^2} \right) dx \\ "MGF", -3 \left(\int_0^{\ln(1 + \sqrt{2})} \right) \end{array} \right)$

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

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

Resetting high to RV 's maximum support value

```

Rescaling  $h(x)$  to  $R$ 's maximum support value
-3\,{\frac {\cosh \left( x \right) }{\sinh \left( x \right) }}+2\,{\frac {\sinh \left( x \right) }{\cosh \left( x \right) }}-1
"i is", 16,

```

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

$$l := 0$$

$u := \infty$

$$Temp := \left[\left[y \rightsquigarrow \frac{3 \left(e^{-2 + 2 \operatorname{arctanh} \left(\frac{1}{y} \right)} - 2 e^{-1 + \operatorname{arctanh} \left(\frac{1}{y} \right)} + 1 \right) e^{3 - 3 \operatorname{arctanh} \left(\frac{1}{y} \right)}}{y^2 - 1} \right], \left[1, \right. \right]$$

$$\frac{e+e^{-1}}{e-e^{-1}} \Bigg], ["Continuous", "PDF"] \Bigg]$$

"1 and u", 0, ∞

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

$$"f(x)" = \frac{3 \left(e^{-2 + 2 \operatorname{arctanh}\left(\frac{1}{x}\right)} - 2 e^{-1 + \operatorname{arctanh}\left(\frac{1}{x}\right)} + 1 \right) e^{3 - 3 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{x^2 - 1}$$

$$"F(x)", 3 \left(\int_1^x \frac{\left(e^{-2 + 2 \operatorname{arctanh}\left(\frac{1}{t}\right)} - 2 e^{-1 + \operatorname{arctanh}\left(\frac{1}{t}\right)} + 1 \right) e^{3 - 3 \operatorname{arctanh}\left(\frac{1}{t}\right)}}{t^2 - 1} dt \right)$$

$$\text{"S(x)"}, 1 - 3 \left(\int_1^x \frac{\left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{t}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{t}\right)} + 1 \right) e^{3-3 \operatorname{arctanh}\left(\frac{1}{t}\right)}}{t^2-1} dt \right)$$

"h(x)",

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

$$\left. \left. - 1 + 3 \left(\int_1^x \frac{\left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{t}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{t}\right)} + 1 \right) e^{3-3 \operatorname{arctanh}\left(\frac{1}{t}\right)}}{t^2-1} dt \right) \right) \right)$$

$$\text{"mean and variance"}, 3 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x \left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{x}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{x}\right)} + 1 \right) e^{3-3 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{x^2-1} dx \right)$$

$$dx, 3 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x^2 \left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{x}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{x}\right)} + 1 \right) e^{3-3 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{x^2-1} dx \right)$$

$$- 9 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{x \left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{x}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{x}\right)} + 1 \right) e^{3-3 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{x^2-1} dx \right)^2$$

$$\text{"MF"}, \int_1^{\frac{e+e^{-1}}{e-e^{-1}}} 3 x^{\sim} \left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{x}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{x}\right)} + 1 \right) e^{3-3 \operatorname{arctanh}\left(\frac{1}{x}\right)} dx$$

$$\text{"MGF"}, 3 \left(\int_1^{\frac{e^2+1}{e^2-1}} \frac{\left(e^{-2+2 \operatorname{arctanh}\left(\frac{1}{x}\right)} - 2 e^{-1+\operatorname{arctanh}\left(\frac{1}{x}\right)} + 1 \right) e^{tx+3-3 \operatorname{arctanh}\left(\frac{1}{x}\right)}}{x^2-1} dx \right)$$

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

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

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

Resetting high to RV 's maximum support value

"-----"

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

$$l := 0$$

$u := \infty$

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

$$\left. \frac{2}{e - e^{-1}} \right], ["Continuous", "PDF"] \right]$$

"1 and u", 0, ∞

"g(x)", $\frac{1}{\sinh(x+1)}$, "base", 3 $(e^{2x} - 2e^x + 1)e^{-3x}$, "HypoExponentialRV(1,2,3)"

$$"f(x)", \frac{3 \left(e^{-2 + 2 \operatorname{arcsinh}\left(\frac{1}{x}\right)} - 2 e^{-1 + \operatorname{arcsinh}\left(\frac{1}{x}\right)} + 1 \right) e^{3 - 3 \operatorname{arcsinh}\left(\frac{1}{x}\right)}}{\sqrt{x^2 + 1} |x|}$$

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

"IDF(x)", $\left[\left[s \rightarrow \left(e \left(-6 e^6 2^{1/3} s + 6 e^6 2^{1/3} - 2 e^4 2^{1/3} s^2 + 2 e^4 2^{1/3} s - 2 e^4 \left(e^{12} s - e^{12} - 3 e^8 s^2 \right) \right) \right) \right]$

$$\begin{aligned}
& + 3e^8 s + 27e^6 s^2 \\
& + e^6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - 54e^6 s + 30s^3 e^4 + 27e^6 - 57e^4 s^2 + 9e^2 s^4 \\
& - 3e^4 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& + 27e^4 s - 18s^3 e^2 + s^5 \\
& - 6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} e^2 \\
& s + 9e^2 s^2 - 3s^4 \\
& + 9e^2 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} s^2 \\
& + 2s^3)^{1/3} + 6e^2 2^{1/3} s^2 - 2^{2/3} (e^{12} s - e^{12} - 3e^8 s^2 + 3e^8 s + 27e^6 s^2 \\
& + e^6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - 54e^6 s + 30s^3 e^4 + 27e^6 - 57e^4 s^2 + 9e^2 s^4 \\
& - 3e^4 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& + 27e^4 s - 18s^3 e^2 + s^5 \\
& - 6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} e^2 \\
& s + 9e^2 s^2 - 3s^4 \\
& + 9e^2 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} s^2 \\
& + 2s^3)^{2/3} - 2e^2 (e^{12} s - e^{12} - 3e^8 s^2 + 3e^8 s + 27e^6 s^2 \\
& + e^6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - 54e^6 s + 30s^3 e^4 + 27e^6 - 57e^4 s^2 + 9e^2 s^4 \\
& - 3e^4 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& + 27e^4 s - 18s^3 e^2 + s^5 \\
& - 6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} e^2 \\
& s + 9e^2 s^2 - 3s^4 \\
& + 9e^2 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)}
\end{aligned}$$

$$\begin{aligned}
& -\sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} s^2 \\
& + 2s^3 \Big)^{1/3} s - 6e^2 2^{1/3} s + 2 2^{1/3} s^3 + 6 (e^{12} s - e^{12} - 3e^8 s^2 + 3e^8 s + 27e^6 s^2 \\
& + e^6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - 54e^6 s + 30s^3 e^4 + 27e^6 - 57e^4 s^2 + 9e^2 s^4 \\
& - 3e^4 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& + 27e^4 s - 18s^3 e^2 + s^5 \\
& - 6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} e^2 \\
& s + 9e^2 s^2 - 3s^4 \\
& + 9e^2 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} s^2 \\
& + 2s^3 \Big)^{1/3} e^2 - 2 2^{1/3} s^2 - 2 (e^{12} s - e^{12} - 3e^8 s^2 + 3e^8 s + 27e^6 s^2 \\
& + e^6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - 54e^6 s + 30s^3 e^4 + 27e^6 - 57e^4 s^2 + 9e^2 s^4 \\
& - 3e^4 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& + 27e^4 s - 18s^3 e^2 + s^5 \\
& - 6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} e^2 \\
& s + 9e^2 s^2 - 3s^4 \\
& + 9e^2 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} s^2 \\
& + 2s^3 \Big)^{1/3} s \Big) \Big) \Big/ \Big((e^{12} s - e^{12} - 3e^8 s^2 + 3e^8 s + 27e^6 s^2 \\
& + e^6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& - 54e^6 s + 30s^3 e^4 + 27e^6 - 57e^4 s^2 + 9e^2 s^4 \\
& - 3e^4 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} \\
& + 27e^4 s - 18s^3 e^2 + s^5 \\
& - 6 \sqrt{(s-1)^2 (e^{12} + 6e^{10} + 6e^8 s + 9e^8 + 2e^6 s^2 + 18e^6 s + 15e^4 s^2 + 6s^3 e^2 + s^4)} e^2 \\
& s + 9e^2 s^2 - 3s^4
\end{aligned}$$

$$\begin{aligned}
& + 9 e^2 \sqrt{(s-1)^2 (e^{12} + 6 e^{10} + 6 e^8 s + 9 e^8 + 2 e^6 s^2 + 18 e^6 s + 15 e^4 s^2 + 6 s^3 e^2 + s^4)} \\
& - \sqrt{(s-1)^2 (e^{12} + 6 e^{10} + 6 e^8 s + 9 e^8 + 2 e^6 s^2 + 18 e^6 s + 15 e^4 s^2 + 6 s^3 e^2 + s^4)} s^2 \\
& + 2 s^3 \Big)^{1/3} (6 e^2 s + s^2 - 9 e^2 + 3 e^4 - e^6) \Big], [0, 1], ["Continuous", "IDF"] \Big] \\
\text{"S(x)"}, & \frac{1}{\sqrt{x^2 + 1} x^2 + 4 \sqrt{x^2 + 1} + 3 x^2 + 4} \left(-e^3 x^3 + 3 e^2 \sqrt{x^2 + 1} x^2 + 3 e^2 x^2 - 3 e x^3 - 6 \right. \\
& \left. e \sqrt{x^2 + 1} x + \sqrt{x^2 + 1} x^2 - 6 e x + 3 x^2 + 4 \sqrt{x^2 + 1} + 4 \right) \\
\text{"h(x)"}, & \left(3 \left(e^{-2 + 2 \operatorname{arcsinh}(\frac{1}{x})} - 2 e^{-1 + \operatorname{arcsinh}(\frac{1}{x})} + 1 \right) e^{3 - 3 \operatorname{arcsinh}(\frac{1}{x})} \left(\sqrt{x^2 + 1} x^2 \right. \right. \\
& \left. \left. + 4 \sqrt{x^2 + 1} + 3 x^2 + 4 \right) \right) \Big/ \left(\sqrt{x^2 + 1} |x| \left(-e^3 x^3 + 3 e^2 \sqrt{x^2 + 1} x^2 + 3 e^2 x^2 - 3 e x^3 \right. \right. \\
& \left. \left. - 6 e \sqrt{x^2 + 1} x + \sqrt{x^2 + 1} x^2 - 6 e x + 3 x^2 + 4 \sqrt{x^2 + 1} + 4 \right) \right) \\
\text{"mean and variance"}, & 3 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{\left(e^{-2 + 2 \operatorname{arcsinh}(\frac{1}{x})} - 2 e^{-1 + \operatorname{arcsinh}(\frac{1}{x})} + 1 \right) e^{3 - 3 \operatorname{arcsinh}(\frac{1}{x})}}{\sqrt{x^2 + 1}} \right. \\
& \left. dx \right), 3 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{x \left(e^{-2 + 2 \operatorname{arcsinh}(\frac{1}{x})} - 2 e^{-1 + \operatorname{arcsinh}(\frac{1}{x})} + 1 \right) e^{3 - 3 \operatorname{arcsinh}(\frac{1}{x})}}{\sqrt{x^2 + 1}} dx \right) \\
& - 9 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{\left(e^{-2 + 2 \operatorname{arcsinh}(\frac{1}{x})} - 2 e^{-1 + \operatorname{arcsinh}(\frac{1}{x})} + 1 \right) e^{3 - 3 \operatorname{arcsinh}(\frac{1}{x})}}{\sqrt{x^2 + 1}} dx \right)^2 \\
\text{"MF"}, & \int_0^{\frac{2}{e - e^{-1}}} \frac{3 x^{\sim} \left(e^{-2 + 2 \operatorname{arcsinh}(\frac{1}{x})} - 2 e^{-1 + \operatorname{arcsinh}(\frac{1}{x})} + 1 \right) e^{3 - 3 \operatorname{arcsinh}(\frac{1}{x})}}{\sqrt{x^2 + 1} |x|} dx \\
\text{"MGF"}, & 3 \left(\int_0^{\frac{2e}{e^2 - 1}} \frac{\left(e^{-2 + 2 \operatorname{arcsinh}(\frac{1}{x})} - 2 e^{-1 + \operatorname{arcsinh}(\frac{1}{x})} + 1 \right) e^{tx + 3 - 3 \operatorname{arcsinh}(\frac{1}{x})}}{\sqrt{x^2 + 1} x} dx \right)
\end{aligned}$$

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

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

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

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

Resetting high to RV's maximum support value

```
3, {\frac{ \left( \left( e^{-2+2 \sqrt{y}} \operatorname{arcsinh}\left( x^{-1} \right) \right) -2, \left( \left( e^{-1+\operatorname{arcsinh}\left( x^{-1} \right) } \right) +1 \right) \right) }{ \left( \left( e^{3-3 \sqrt{y}} \operatorname{arcsinh}\left( x^{-1} \right) \right) \right) \sqrt{ \left( x^2+1 \right) } } \operatorname{left| } x \operatorname{right| } } }  
"i is", 18,  
"  
-----'  
-----'
```

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

$$"F(x)", - \left(3 e^{\frac{1}{2} \left(3 e^x + 4 e^x + 2 \right)} e^{-\frac{1}{x}} - 3 e^{\frac{1}{2} \left(4 e^x + 2 e^x + 1 \right)} e^{-\frac{1}{x}} \right. \\ \left. - e^{\frac{1}{2} \left(2 e^x + 6 e^x + 3 \right)} e^{-\frac{1}{x}} \right) e^{-\frac{5}{2} e^x}$$

$$"IDF(x)", \left[s \mapsto 1 \middle/ \left(-\ln(3) + \ln \left(-\ln(2) + 3 \ln \left(\frac{1}{s} \right) \right) \right) \right]$$

$$\begin{aligned}
& - \frac{1}{s ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3}} (2^{2/3} s - 2^{2/3} - 2^{1/3} ((s-1) (\text{csgn}(s-1) s+s-2) \\
& + s-2))^{1/3} - ((s-1) (\text{csgn}(s-1) s+s-2))^{2/3}) \Big) + 3 \\
& + \left(\ln(2)^2 - 6 \ln(2) \ln \left(- \frac{1}{s ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3}} (2^{2/3} s \right. \right. \\
& \left. \left. - 2^{2/3} - 2^{1/3} ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3} - ((s-1) (\text{csgn}(s-1) s+s-2) \right. \right. \\
& \left. \left. - 2))^{2/3}) \right) + 9 \ln \left(- \frac{1}{s ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3}} (2^{2/3} s - 2^{2/3} \right. \right. \\
& \left. \left. - 2^{1/3} ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3} - ((s-1) (\text{csgn}(s-1) s+s-2))^{2/3}) \right)^2 \right. \\
& \left. - 6 \ln(2) + 18 \ln \left(- \frac{1}{s ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3}} (2^{2/3} s - 2^{2/3} \right. \right. \\
& \left. \left. - 2^{1/3} ((s-1) (\text{csgn}(s-1) s+s-2))^{1/3} - ((s-1) (\text{csgn}(s-1) s+s-2))^{2/3}) \right) \right. \\
& \left. + 18 \right)^{1/2} \Big) \Big) \Big], [0, 1], ["Continuous", "IDF"] \Big] \\
& "S(x)", 3 e^{-\left(\frac{2}{e^x} - 2e^x - 1\right)} e^{-\frac{1}{x}} - 3 e^{-\frac{1}{2} \left(\frac{2}{e^x} - 2e^x - 1\right)} e^{-\frac{1}{x}} - e^{-\frac{3}{2} \left(\frac{2}{e^x} - 2e^x - 1\right)} e^{-\frac{1}{x}} + 1 \\
& "h(x)",
\end{aligned}$$

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

"i is", 19,

$$\frac{-----}{-----}$$

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

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y \rightarrow \frac{6 (y \sqrt{y^2 - 2 y + 2} + y^2 - 2 \sqrt{y^2 - 2 y + 2} - 3 y + 3)}{\sqrt{y^2 - 2 y + 2} (y - 1 + \sqrt{y^2 - 2 y + 2})^3} \right], [1, \infty], \right. \\ \left. ["Continuous", "PDF"] \right]$$

"l and u", 0, ∞

$$"g(x)", \frac{1}{\text{csch}(x)} + 1, "base", 3 (e^{2x} - 2 e^x + 1) e^{-3x}, "HypoExponentialRV(1,2,3)"$$

$$"f(x)", \frac{6 (x \sqrt{x^2 - 2 x + 2} + x^2 - 2 \sqrt{x^2 - 2 x + 2} - 3 x + 3)}{\sqrt{x^2 - 2 x + 2} (x - 1 + \sqrt{x^2 - 2 x + 2})^3}$$

$$"F(x)", -6 x^2 + 2 x \sqrt{x^2 - 2 x + 2} - 2 \sqrt{x^2 - 2 x + 2} + 6 x - 4 \sqrt{x^2 - 2 x + 2} x^2 + 4 x^3$$

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

ERROR(IDF): Could not find the appropriate inverse

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

$$"S(x)", 1 + 6 x^2 - 2 x \sqrt{x^2 - 2 x + 2} + 2 \sqrt{x^2 - 2 x + 2} - 6 x + 4 \sqrt{x^2 - 2 x + 2} x^2 - 4 x^3$$

$$"h(x)", \left(6 (x \sqrt{x^2 - 2 x + 2} + x^2 - 2 \sqrt{x^2 - 2 x + 2} - 3 x + 3) \right) / \left(\sqrt{x^2 - 2 x + 2} (x - 1 + \sqrt{x^2 - 2 x + 2})^3 (1 + 6 x^2 - 2 x \sqrt{x^2 - 2 x + 2} + 2 \sqrt{x^2 - 2 x + 2} - 6 x + 4 \sqrt{x^2 - 2 x + 2} x^2 - 4 x^3) \right)$$

"mean and variance", ∞ , *undefined*

$$"MF", \int_1^\infty \frac{6 x^r (x \sqrt{x^2 - 2 x + 2} + x^2 - 2 \sqrt{x^2 - 2 x + 2} - 3 x + 3)}{\sqrt{x^2 - 2 x + 2} (x - 1 + \sqrt{x^2 - 2 x + 2})^3} dx$$

$$"MGF", \int_1^\infty \frac{6 e^{tx} (x \sqrt{x^2 - 2 x + 2} + x^2 - 2 \sqrt{x^2 - 2 x + 2} - 3 x + 3)}{\sqrt{x^2 - 2 x + 2} (x - 1 + \sqrt{x^2 - 2 x + 2})^3} dx$$

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

6, {\frac {{x} \sqrt{{x} ^{2}-2\,x+2}+{x} ^{2}-2\,\sqrt{{x} ^{2}-2\,x+2}-3\,x+3}{\sqrt{{x} ^{2}-2\,x+2} \left(x-1+\sqrt{{x} ^{2}-2\,x+2} \right) ^{3}}}, \sqrt{{x} ^{2}-2\,x+2}, \\ {\sqrt{{x} ^{2}-2\,x+2}} \left(x-1+\sqrt{{x} ^{2}-2\,x+2} \right) ^{3}

```

\right) ^{ \{ 3 \} } \}
"i is", 20,
"
-----"
-----"

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


$$l := 0$$


$$u := \infty$$


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

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

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


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

"IDF(x)", 
$$\left[ \begin{array}{c} s \\ \rightarrow \begin{cases} e \\ -1 \end{cases} \end{array} \right] \right/$$


$$- \frac{6}{\ln(2) - 3 \ln\left(-\frac{2^{2/3} s - 2^{2/3} - ((s-1) (\operatorname{csgn}(s-1) s + s - 2))^{1/3} 2^{1/3} - ((s-1) (\operatorname{csgn}(s-1) s + s - 2))^{2/3}}{((s-1) (\operatorname{csgn}(s-1) s + s - 2))^{1/3} s}\right)}$$


```

$$\begin{aligned}
& - \frac{e^{\frac{6}{\ln(2) - 3 \ln\left(\frac{-2^{2/3} s - 2^{2/3} - ((s-1)(\text{csgn}(s-1)s+s-2))^{1/3} 2^{1/3} - ((s-1)(\text{csgn}(s-1)s+s-2))^{2/3}}{((s-1)(\text{csgn}(s-1)s+s-2))^{1/3} s}\right)}}{6} \\
& + 1 \left. \right] \left. \right], [0, 1], ["Continuous", "IDF"] \left. \right] \\
& "S(x)", \left(e^{\frac{6}{\ln(x+1) - \ln(1-x)}} - 3 e^{\frac{4}{\ln(x+1) - \ln(1-x)}} + 3 e^{\frac{2}{\ln(x+1) - \ln(1-x)}} \right. \\
& \left. - 1 \right) e^{-\frac{6}{\ln(x+1) - \ln(1-x)}} \\
& "h(x)", \left(3 \left(-e^{\frac{2}{\text{arctanh}(x)}} + 2 e^{\frac{1}{\text{arctanh}(x)}} - 1 \right) e^{\frac{3(-\ln(x+1) + \ln(1-x) + 2 \text{arctanh}(x))}{\text{arctanh}(x) (\ln(x+1) - \ln(1-x))}} \right) \left. \right) \\
& \left(\text{arctanh}(x)^2 (x^2 - 1) \left(e^{\frac{6}{\ln(x+1) - \ln(1-x)}} - 3 e^{\frac{4}{\ln(x+1) - \ln(1-x)}} + 3 e^{\frac{2}{\ln(x+1) - \ln(1-x)}} \right. \right. \\
& \left. \left. - 1 \right) \right) \\
& "mean and variance", 3 \left(\int_0^1 \frac{x \left(-e^{\frac{2}{\text{arctanh}(x)}} + 2 e^{\frac{1}{\text{arctanh}(x)}} - 1 \right) e^{-\frac{3}{\text{arctanh}(x)}}}{\text{arctanh}(x)^2 (x^2 - 1)} dx \right), -3 \left(\right. \\
& \left. \int_0^1 \frac{x^2 \left(e^{\frac{2}{\text{arctanh}(x)}} - 2 e^{\frac{1}{\text{arctanh}(x)}} + 1 \right) e^{-\frac{3}{\text{arctanh}(x)}}}{\text{arctanh}(x)^2 (x^2 - 1)} dx \right) \\
& - 9 \left(\int_0^1 \frac{x \left(-e^{\frac{2}{\text{arctanh}(x)}} + 2 e^{\frac{1}{\text{arctanh}(x)}} - 1 \right) e^{-\frac{3}{\text{arctanh}(x)}}}{\text{arctanh}(x)^2 (x^2 - 1)} dx \right)^2 \\
& "MF", \int_0^1 \frac{3 x^{r \sim} \left(-e^{\frac{2}{\text{arctanh}(x)}} + 2 e^{\frac{1}{\text{arctanh}(x)}} - 1 \right) e^{-\frac{3}{\text{arctanh}(x)}}}{\text{arctanh}(x)^2 (x^2 - 1)} dx
\end{aligned}$$

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

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

```
3\, , {\frac {1}{{\it arctanh}}\left( x\right) ^{2}}\left( -{{\it e}^{2\, \operatorname{arctanh}}}\left( x\right) ^{-1}\right) \left( -{{\it e}^{-3\, \operatorname{arctanh}}}\left( x\right) ^{-1}\right) -1\right) \left( {{\it e}^{-3\, \operatorname{arctanh}}}\left( x\right) ^{-1}\right) \\ "i is", 21,
```

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

$$l := 0$$

$$u := \infty$$

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

"l and u", 0, ∞

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

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

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

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

"h(x)",

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

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

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

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

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

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

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

Warning, computation interrupted