

```
> restart;  
read("c:/appl/appl7.txt");
```

#### PROCEDURES:

*AllPermutations(n), AllCombinations(n, k), Benford(X), BootstrapRV(Data),  
CDF:CHF:HF:IDF:PDF:SF(X, [x]), CoefOfVar(X), Convolution(X, Y),  
ConvolutionIID(X, n), CriticalPoint(X, prob), Determinant(MATRIX), Difference(X, Y),  
Display(X), ExpectedValue(X, [g]), KSTest(X, Data, Parameters), Kurtosis(X),  
Maximum(X, Y), MaximumIID(X, n), Mean(X), MGF(X), Minimum(X, Y),  
MinimumIID(X, n), Mixture(MixParameters, MixRVs),  
MLE(X, Data, Parameters, [Rightcensor]), MLENHPP(X, Data, Parameters, obstime),  
MLEWeibull(Data, [Rightcensor]), MOM(X, Data, Parameters),  
NextCombination(Previous, size), NextPermutation(Previous), OrderStat(X, n, r, ["wo"]),  
PlotDist(X, [low], [high]), PlotEmpCDF(Data, [low], [high]),  
PlotEmpCIF(Data, [low], [high]), PlotEmpSF(Data, Censor),  
PlotEmpVsFittedCDF(X, Data, Parameters, [low], [high]),  
PlotEmpVsFittedCDF(X, Data, Parameters, [low], [high]),  
PlotEmpVsFittedSF(X, Data, Parameters, Censor, low, high),  
PPPlot(X, Data, Parameters), Product(X, Y), ProductIID(X, n),  
QQPlot(X, Data, Parameters), RangeStat(X, n, ["wo"]), Skewness(X), Transform(X, g),  
Truncate(X, low, high), Variance(X), VerifyPDF(X)*

#### Procedure Notation:

*X and Y are random variables*

*Greek letters are numeric or symbolic parameters*

*x is numeric or symbolic*

*n and r are positive integers,  $n \geq r$*

*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 := InvertedGammaRV(2,3);
bfname := "InvertedGammaRV(2,3)";

```

$$bf := \left[ \left[ x \rightarrow \frac{1}{9} \frac{e^{-\frac{1}{3x}}}{x^3} \right], [0, \infty], ["Continuous", "PDF"] \right]$$

bfname := "InvertedGammaRV(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/Trash.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 loopint through transformations
for i from 11 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

PlotDist(PDF(Temp), 0, 40);
PlotDist(HF(Temp), 0, 40);

od;

```

*filename := "C:/LatexOutput/Trash.tex"*

$$\frac{1}{9} \frac{e^{-\frac{1}{3x}}}{x^3}$$

```

"i is", 11,
" -----
-----"

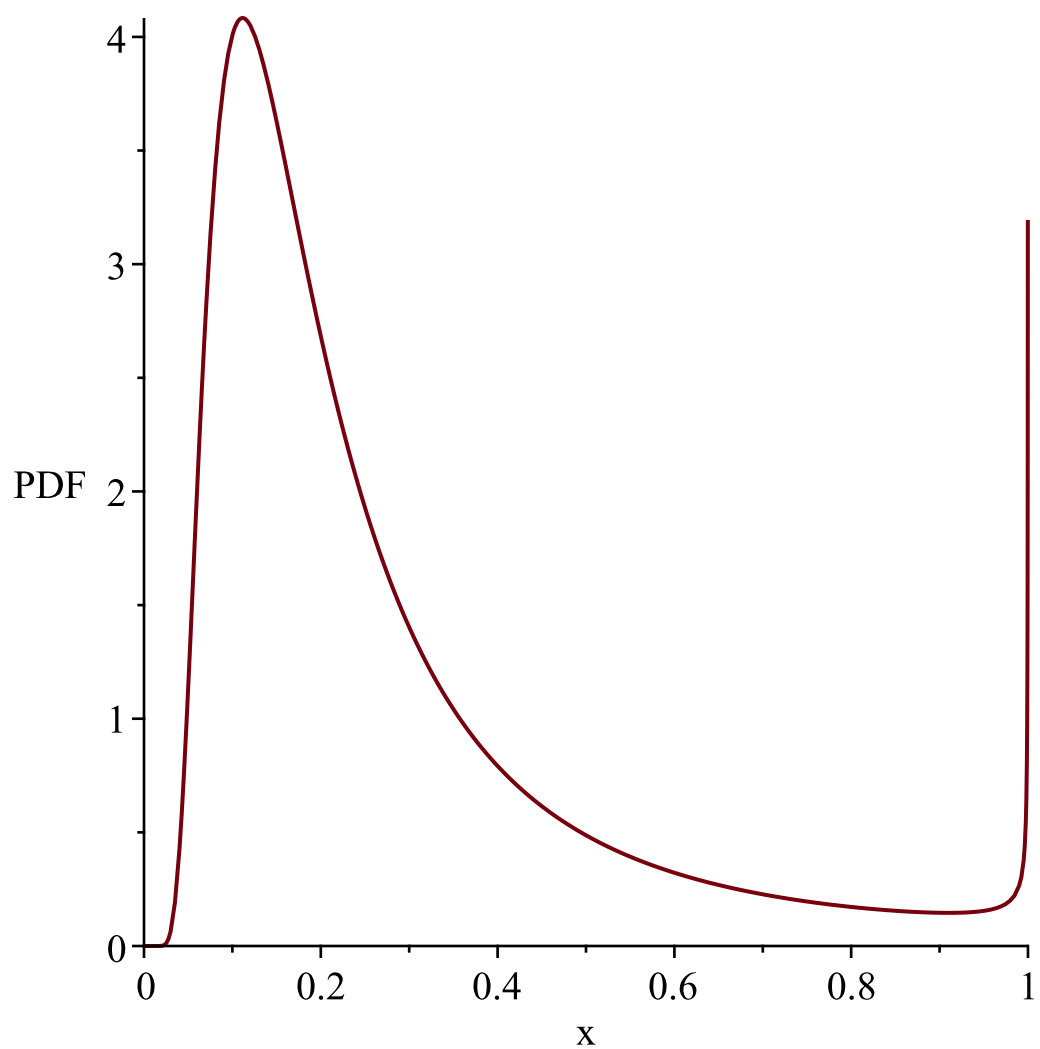
```

$$\begin{aligned}
g &:= t \rightarrow \tanh(t) \\
l &:= 0 \\
u &:= \infty
\end{aligned}$$

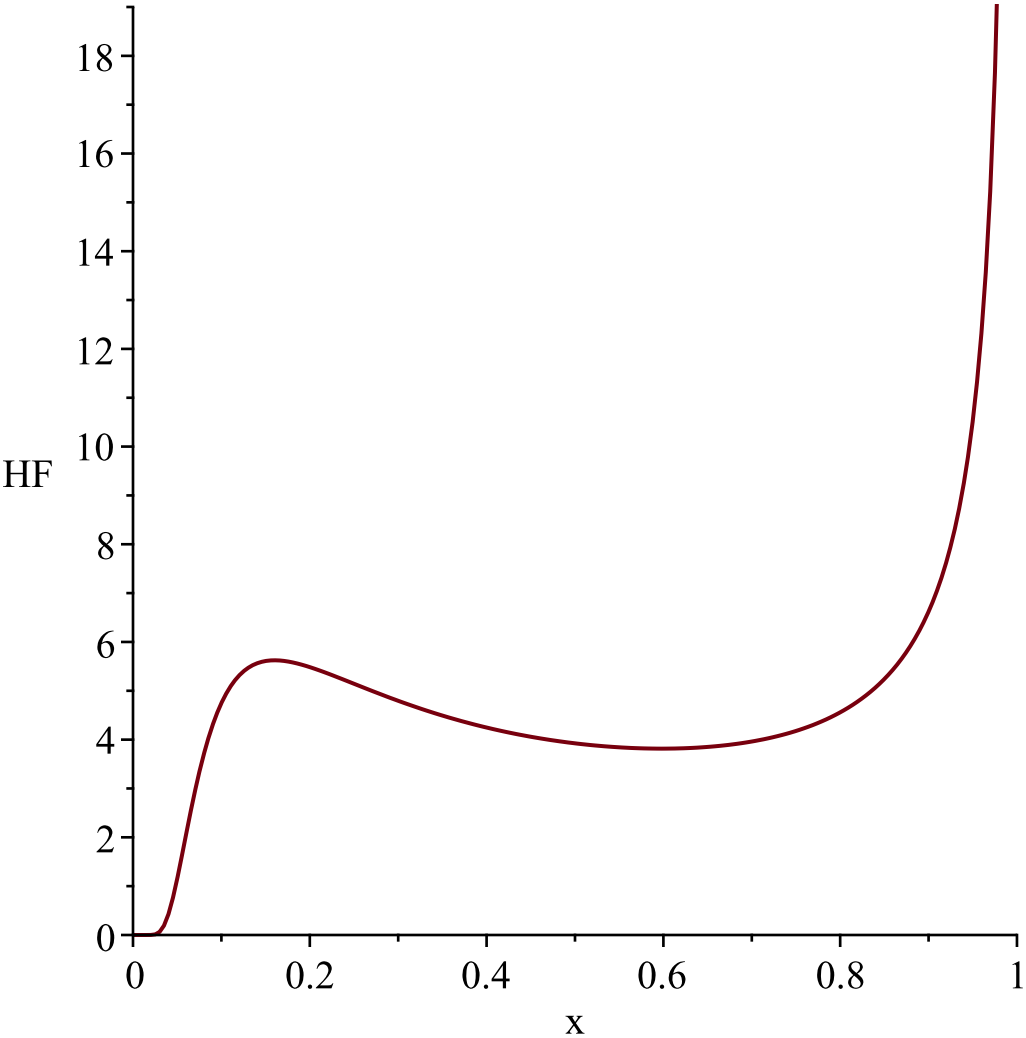
$$Temp := \left[ \left[ y \rightarrow -\frac{1}{9} \frac{e^{-\frac{1}{3 \operatorname{arctanh}(y)}}}{\operatorname{arctanh}(y)^3 (y^2 - 1)} \right], [0, 1], ["Continuous", "PDF"] \right]$$

*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*

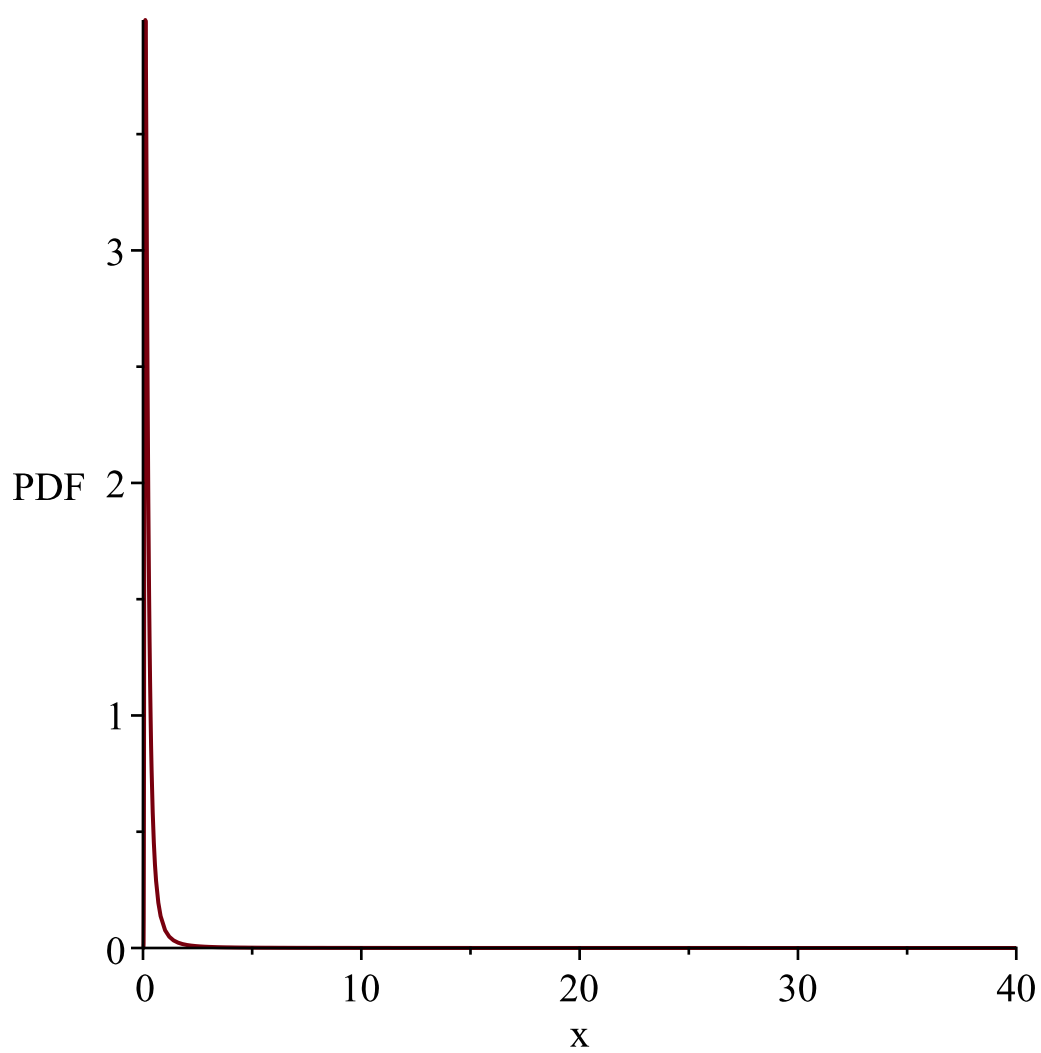


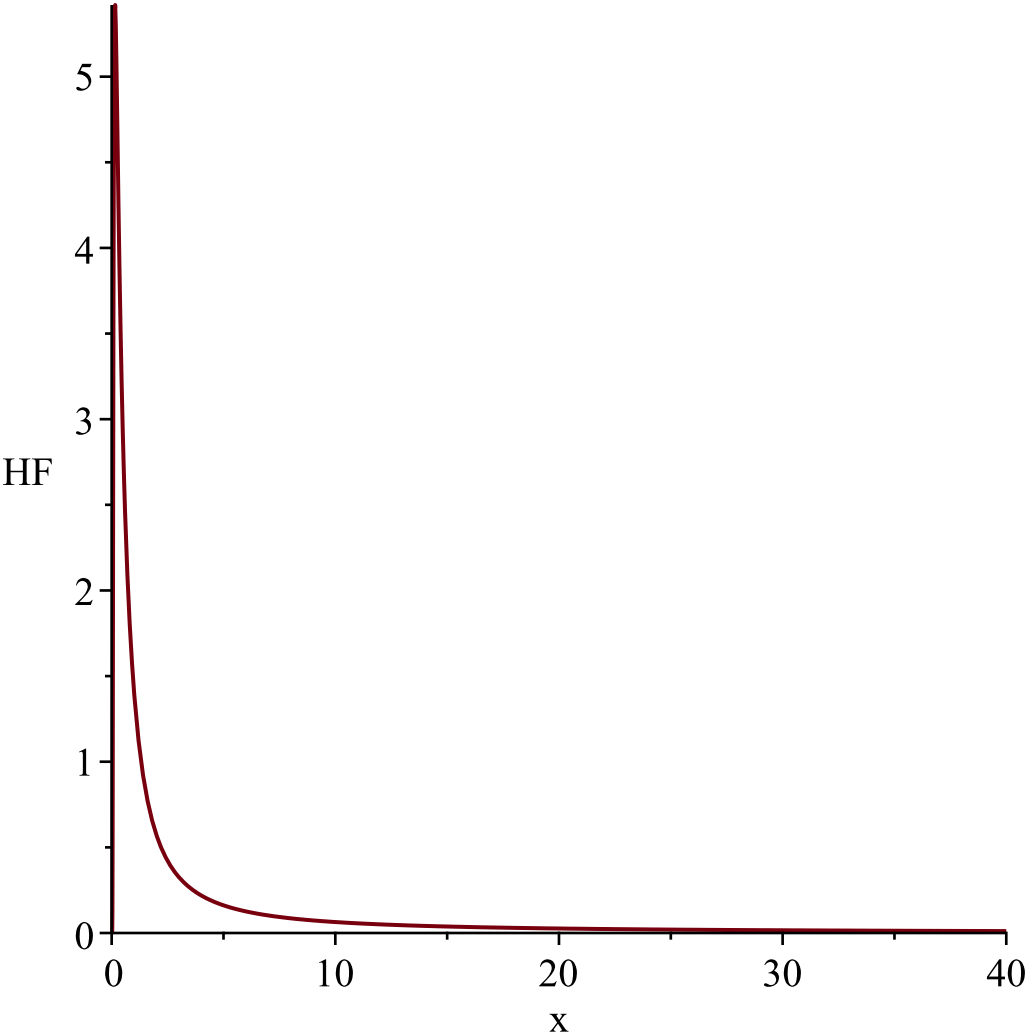
*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random  
variable, 1  
Resetting high to RV's maximum support value*



"i is", 12,  
"-----"  
-----"

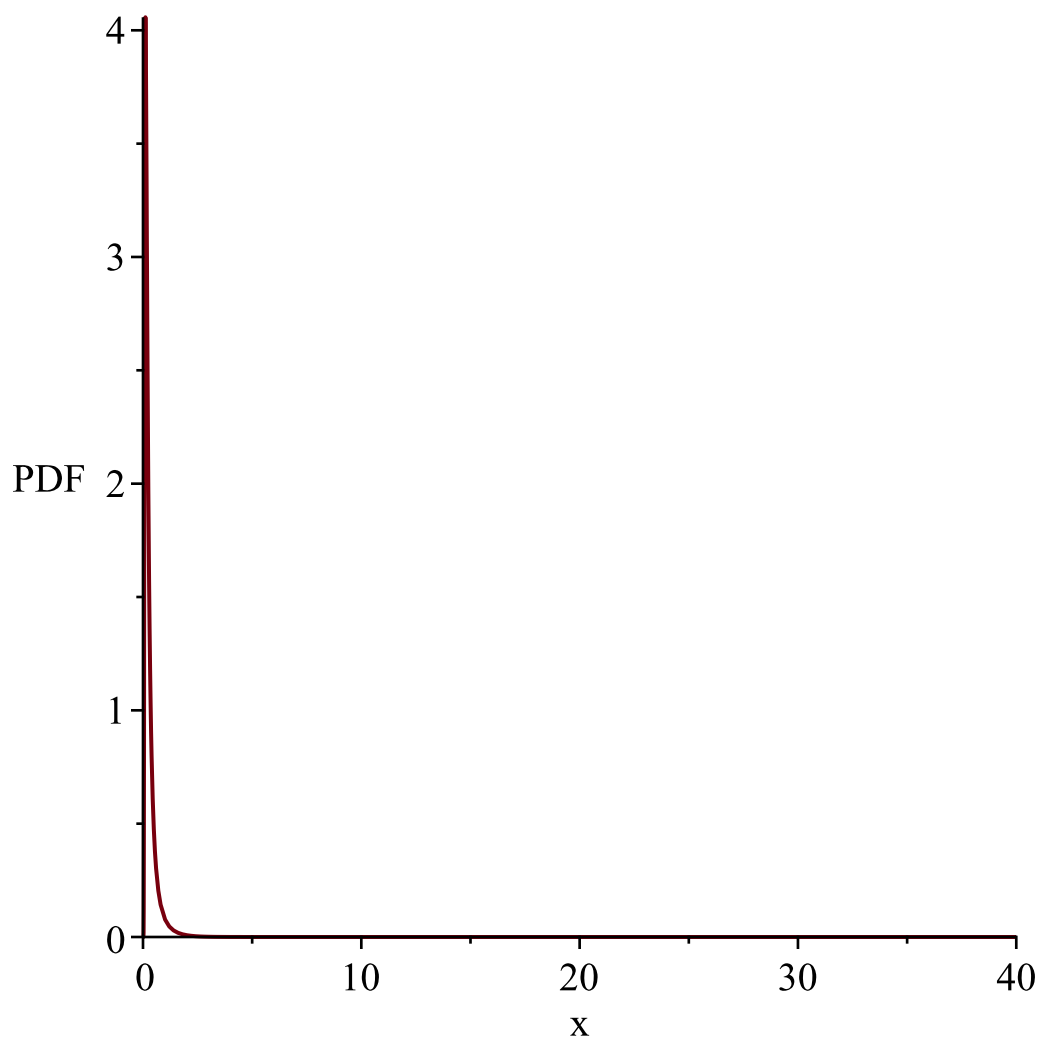
$$\begin{array}{l} g := t \rightarrow \sinh(t) \\ l := 0 \\ u := \infty \\ Temp := \left[ \left[ y \sim \rightarrow \frac{1}{9} \frac{e^{-\frac{1}{3 \operatorname{arcsinh}(y \sim)}}}{\operatorname{arcsinh}(y \sim)^3 \sqrt{y \sim^2 + 1}} \right], [0, \infty], ["Continuous", "PDF"] \right] \end{array}$$



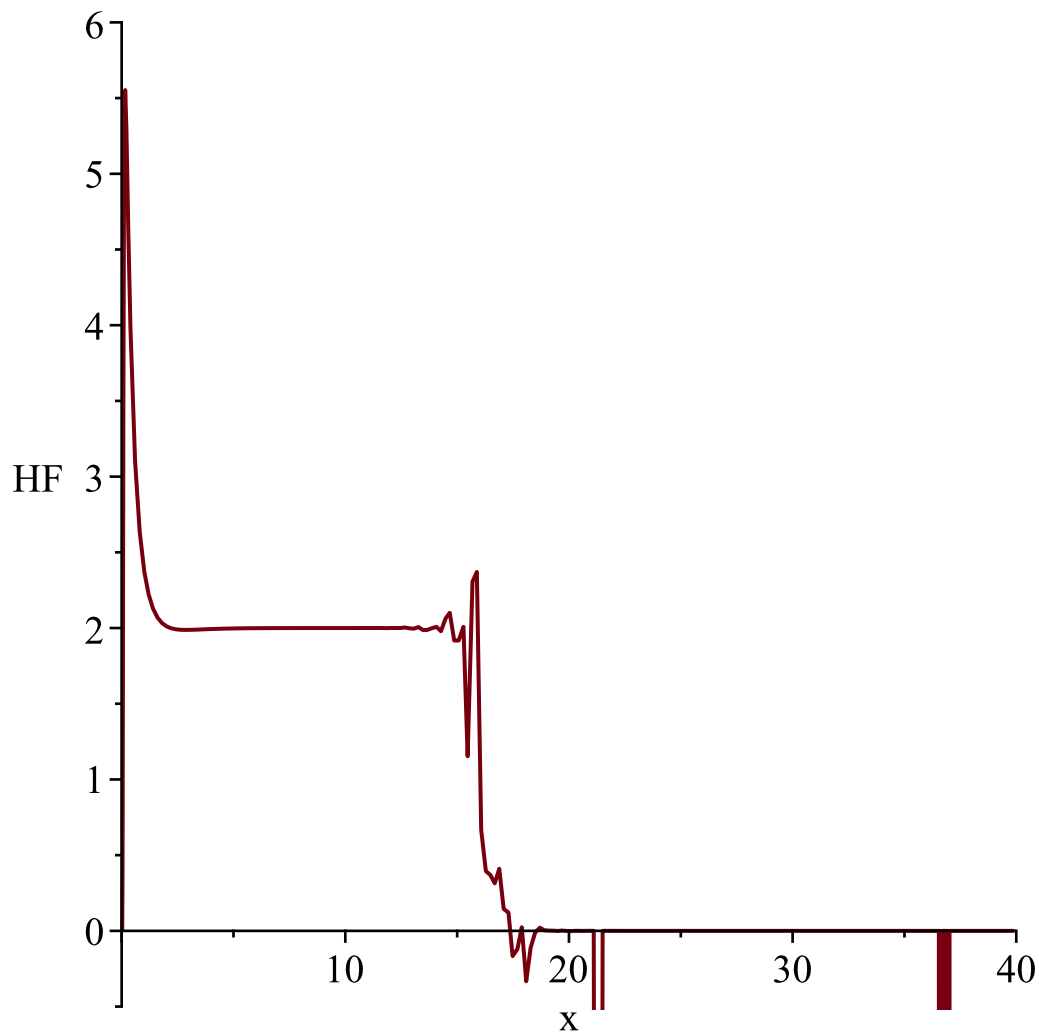


"i is", 13,  
"-----"  
-----"

$$\begin{aligned} g &:= t \rightarrow \operatorname{arcsinh}(t) \\ l &:= 0 \\ u &:= \infty \\ Temp &:= \left[ \left[ y \sim \rightarrow \frac{1}{9} \frac{e^{-\frac{1}{3 \sinh(y \sim)}} \cosh(y \sim)}{\sinh(y \sim)^3} \right], [0, \infty], ["Continuous", "PDF"] \right] \end{aligned}$$







"i is", 14,

"-----"

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

$l := 0$

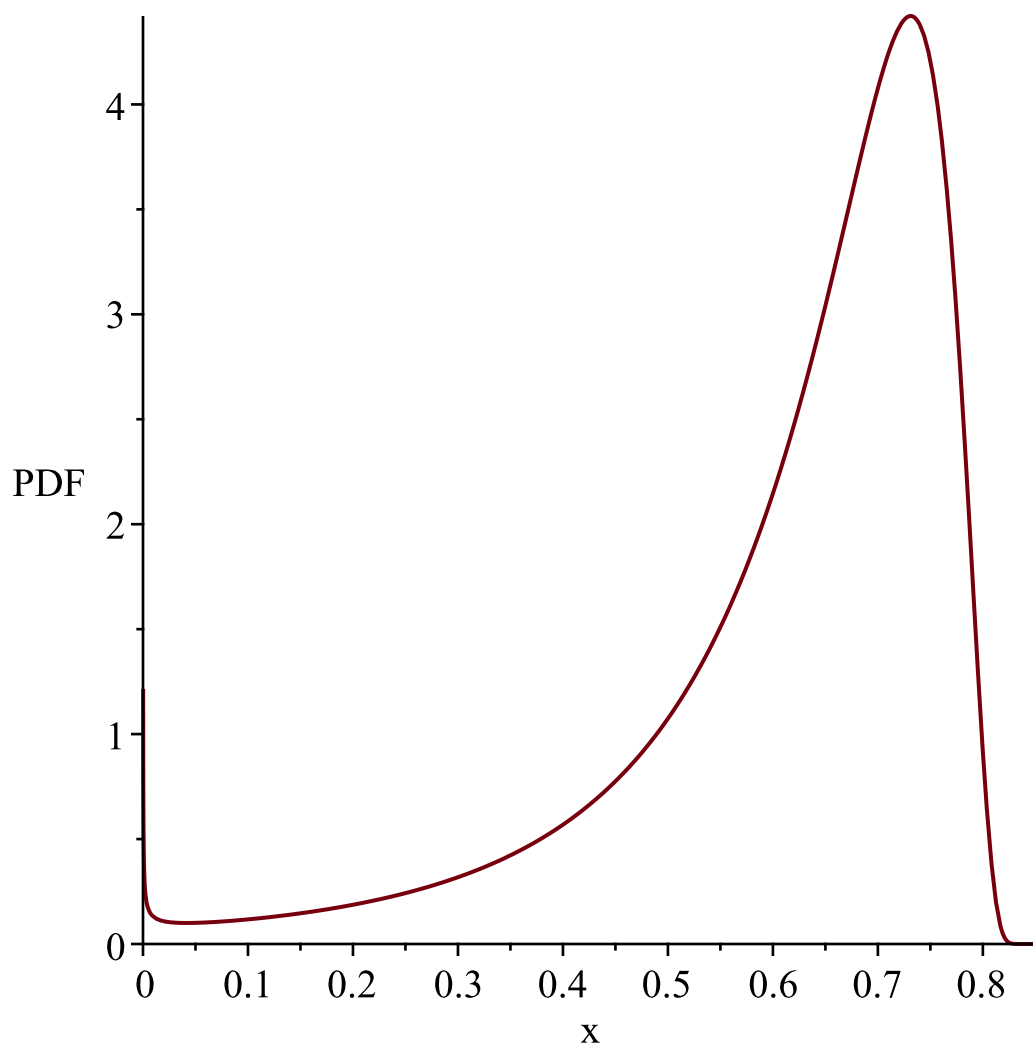
$u := \infty$

$Temp := \left[ \left[ y \sim \rightarrow \frac{1}{9} \frac{e^{-\frac{1}{3(-1 + \text{arccsch}(y))}}}{\sqrt{y^2 + 1} (-1 + \text{arccsch}(y))^3 |y|} \right], \left[ 0, \frac{2}{e - e^{-1}} \right], ["Continuous",$   
 $"PDF"] \right]$

*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*

Warning, computation interrupted