

```
> 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 := FRV(3,4);
bfname := "FRV(3,4)";
bf := 
$$\left[ x \rightarrow \frac{45}{64} \frac{\sqrt{3} \sqrt{4} \sqrt{x}}{\left(\frac{3}{4} x + 1\right)^{7/2}}, [0, \infty], ["Continuous", "PDF"] \right]$$

bfname := "FRV(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/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 15 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"*

$$\frac{45}{64} \frac{\sqrt{3} \sqrt{4} \sqrt{x}}{\left(\frac{3}{4} x + 1\right)^{7/2}}$$

"i is", 15,  
" -----  
-----"

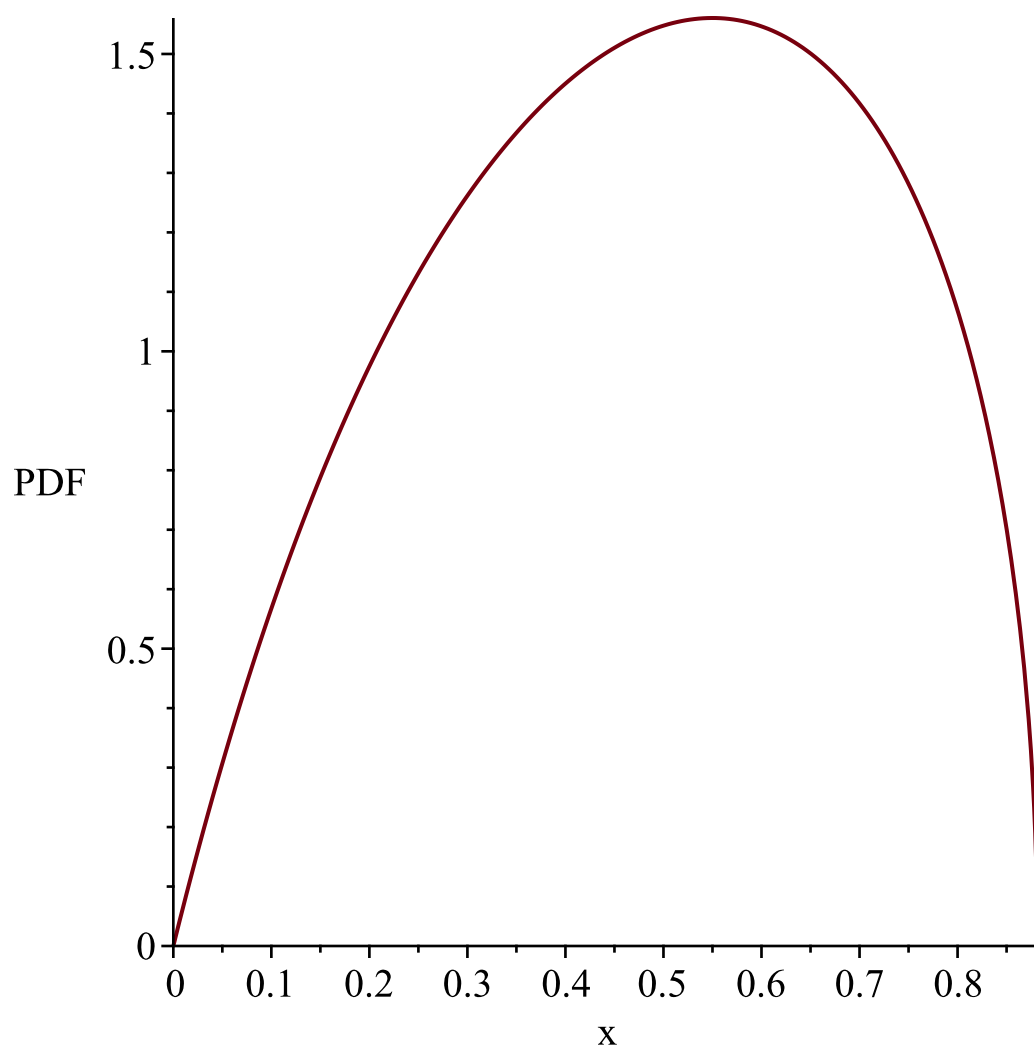
$$g := t \rightarrow \operatorname{arccsch}(t + 1)$$

$$l := 0$$

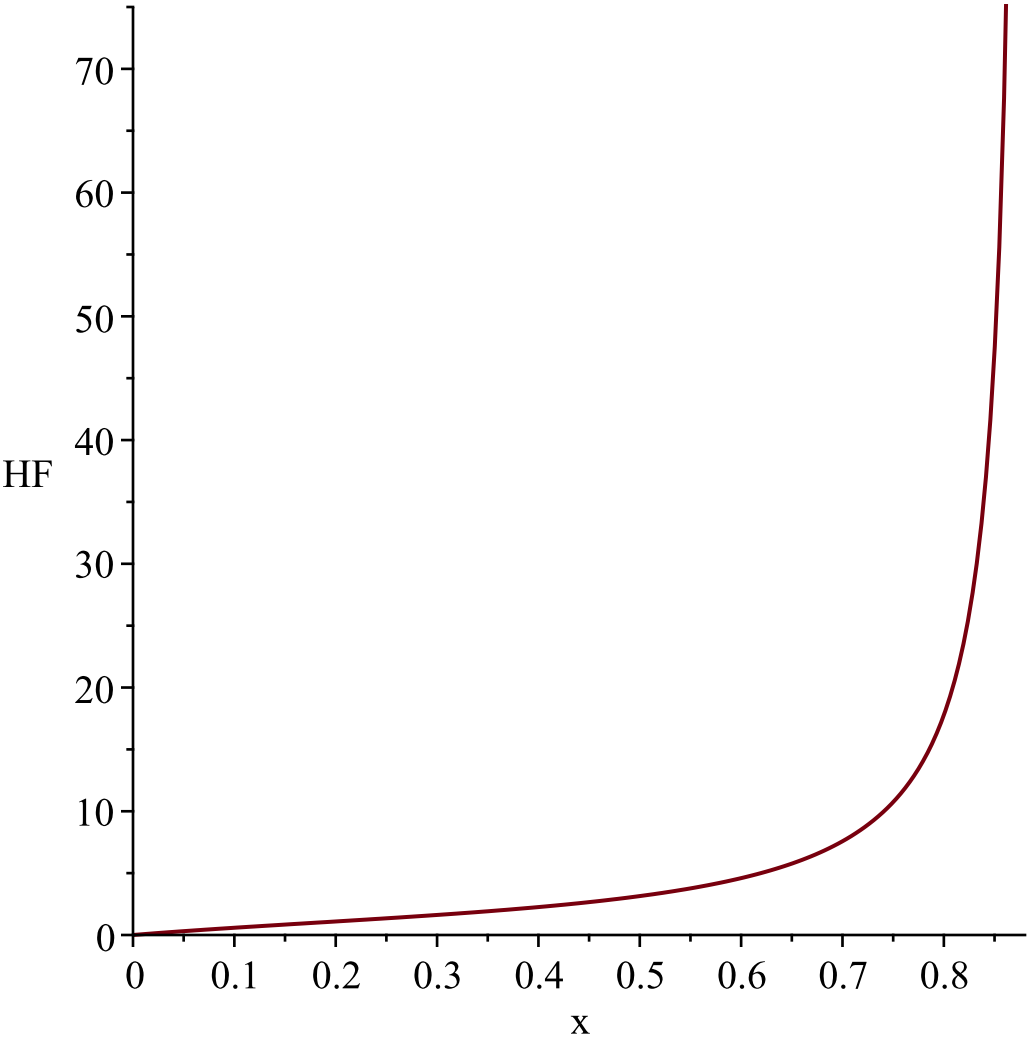
$$u := \infty$$

$$Temp := \left[ \left[ y \sim \rightarrow \frac{180 \sqrt{3} \sqrt{-\frac{\sinh(y \sim) - 1}{\sinh(y \sim)}} \sinh(y \sim) \cosh(y \sim)}{(\sinh(y \sim) + 3)^3 \sqrt{\frac{\sinh(y \sim) + 3}{\sinh(y \sim)}}}, [0, \ln(1 + \sqrt{2})], \right. \right. \\ \left. \left. ["Continuous", "PDF"] \right]$$

*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  
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variable,  $\ln(1 + \sqrt{2})$   
Resetting high to RV's maximum support value*



"i is", 16,  
"-----"  
"-----"

$$g := t \rightarrow \frac{1}{\tanh(t + 1)}$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[ \left[ y \sim \rightarrow \frac{180 \sqrt{3} \sqrt{-1 + \operatorname{arctanh}\left(\frac{1}{y \sim}\right)}}{\left(1 + 3 \operatorname{arctanh}\left(\frac{1}{y \sim}\right)\right)^{7/2} (y \sim^2 - 1)} \right], \left[ 1, \frac{e + e^{-1}}{e - e^{-1}} \right], ["Continuous",$$

"PDF"]

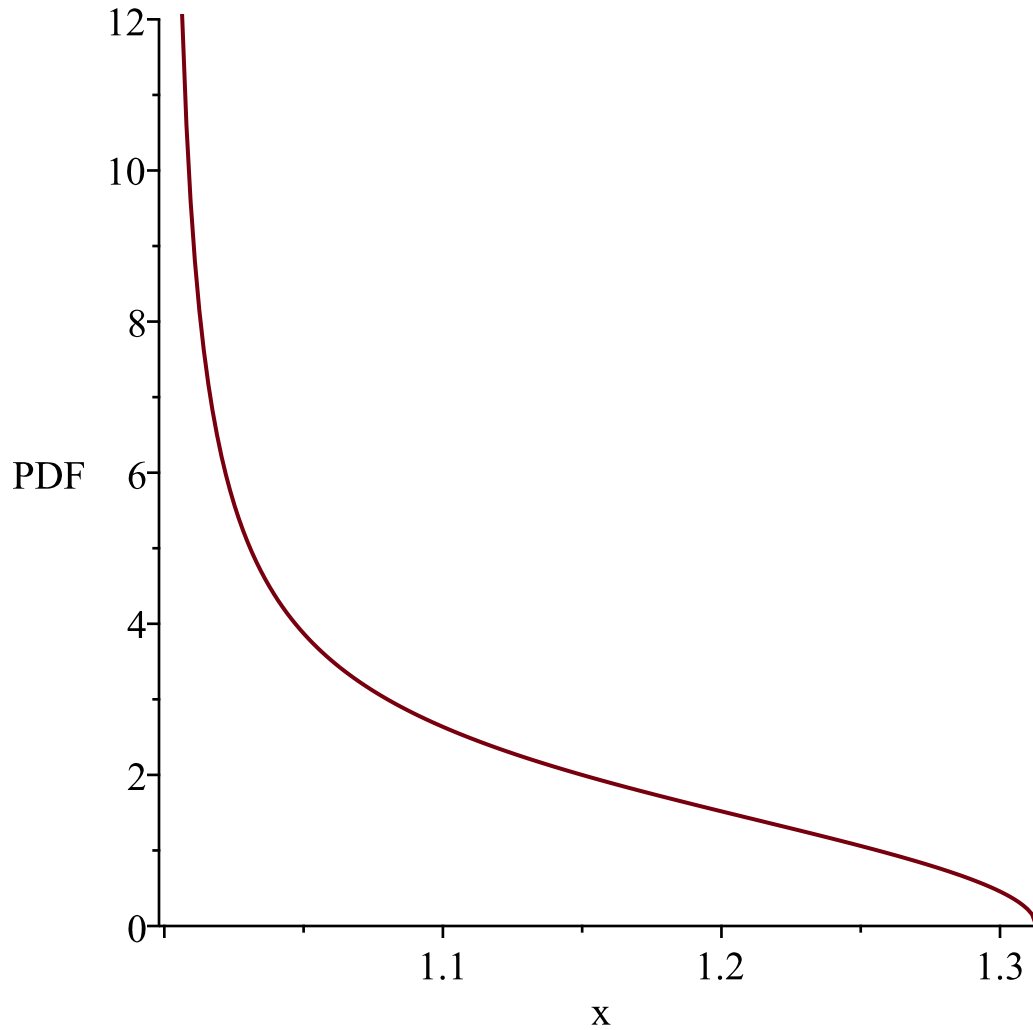
*WARNING(PlotDist): Low value provided by user, 0  
is less than minimum support value of random variable*

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*



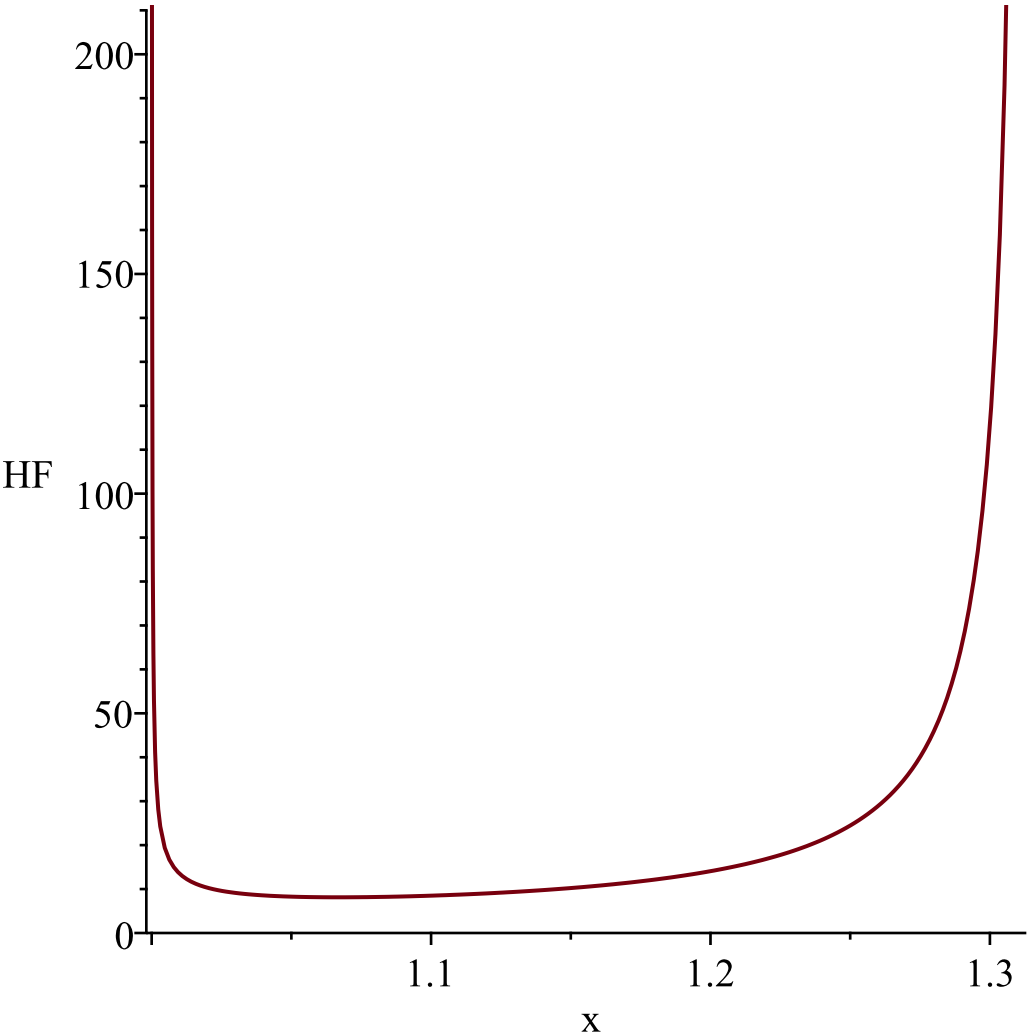
*WARNING(PlotDist): Low value provided by user, 0  
is less than minimum support value of random variable*

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*



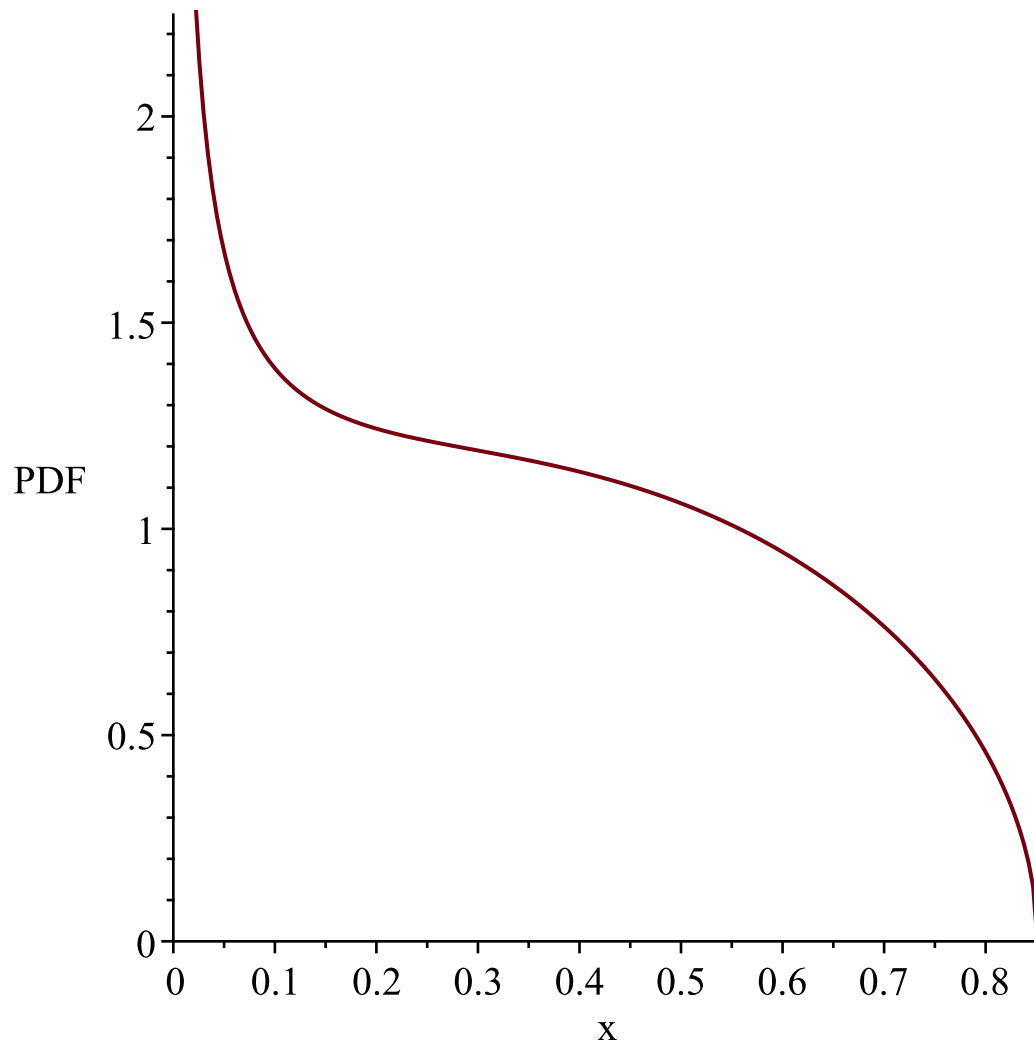
"i is", 17,  
"-----"  
"-----"

$$\begin{aligned} g &:= t \rightarrow \frac{1}{\sinh(t+1)} \\ l &:= 0 \\ u &:= \infty \\ Temp &:= \left[ \left[ y \sim \rightarrow \frac{180 \sqrt{3} \sqrt{-1 + \operatorname{arcsinh}\left(\frac{1}{y \sim}\right)}}{\left(1 + 3 \operatorname{arcsinh}\left(\frac{1}{y \sim}\right)\right)^{7/2} \sqrt{y \sim^2 + 1} |y \sim|}, \left[ 0, \frac{2}{e - e^{-1}} \right], ["Continuous", \right. \right. \\ &\quad \left. \left. "PDF"] \right] \right] \end{aligned}$$

*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*

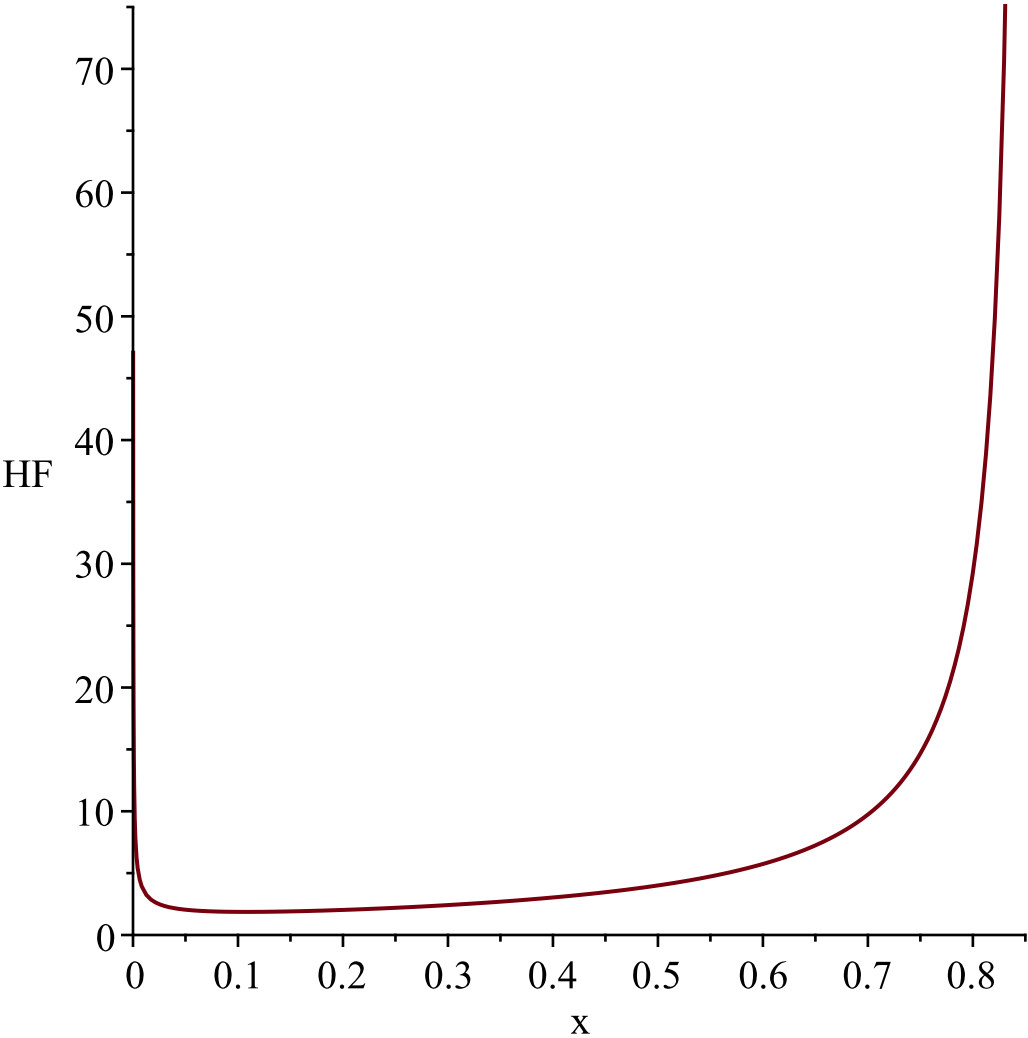


*WARNING(PlotDist): High value provided by user, 40  
is greater than maximum support value of the random*

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

*Resetting high to RV's maximum support value*





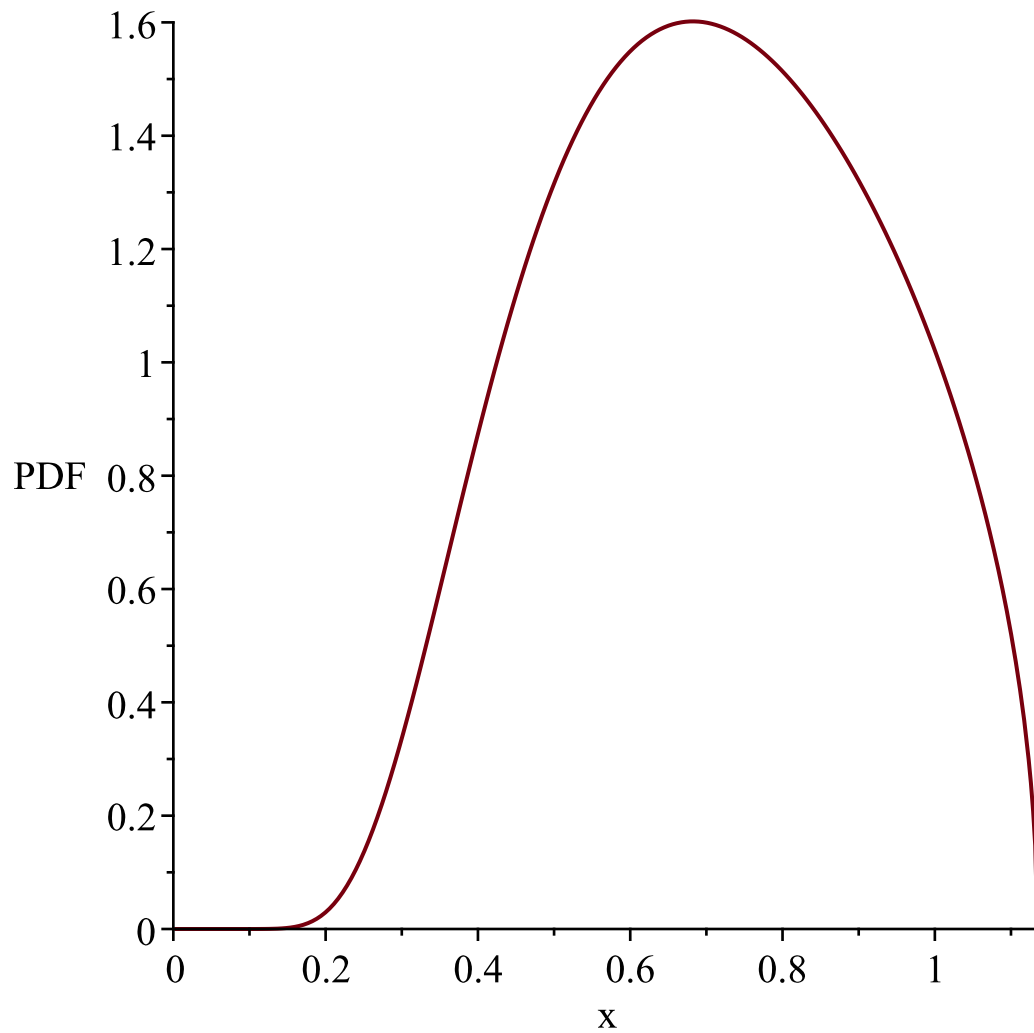
"i is", 18,  
"-----"  
"-----"

$$g := t \rightarrow \frac{1}{\operatorname{arcsinh}(t+1)}$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[ \left[ y \sim \rightarrow \frac{180 \sqrt{3} \sqrt{-1 + \sinh\left(\frac{1}{y \sim}\right)} \cosh\left(\frac{1}{y \sim}\right)}{y \sim^2 \left(1 + 3 \sinh\left(\frac{1}{y \sim}\right)\right)^{7/2}} \right], \left[ 0, \frac{1}{\ln(1 + \sqrt{2})} \right] \right]$$
$$["Continuous", "PDF"]$$

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

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

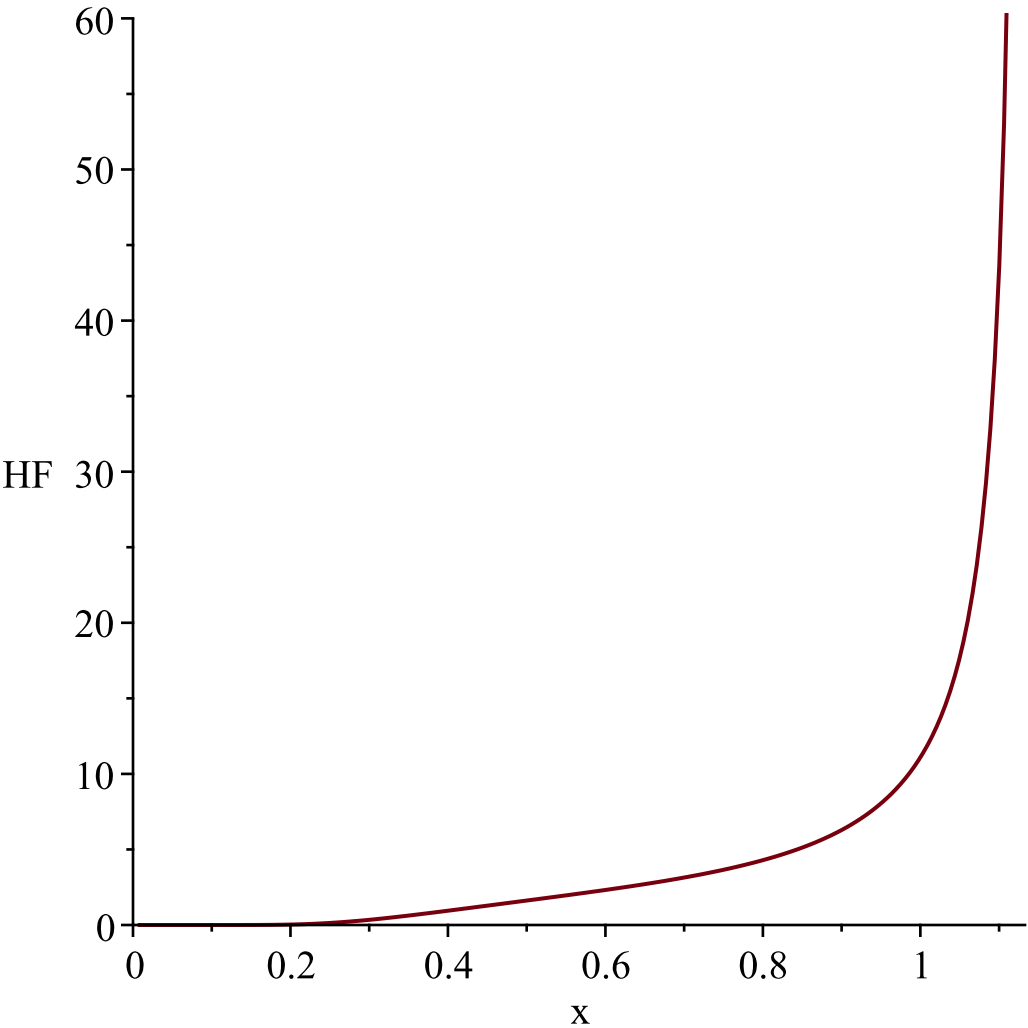
*Resetting high to RV's maximum support value*



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

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

*Resetting high to RV's maximum support value*



"i is", 19,  
"-----"  
"-----"

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

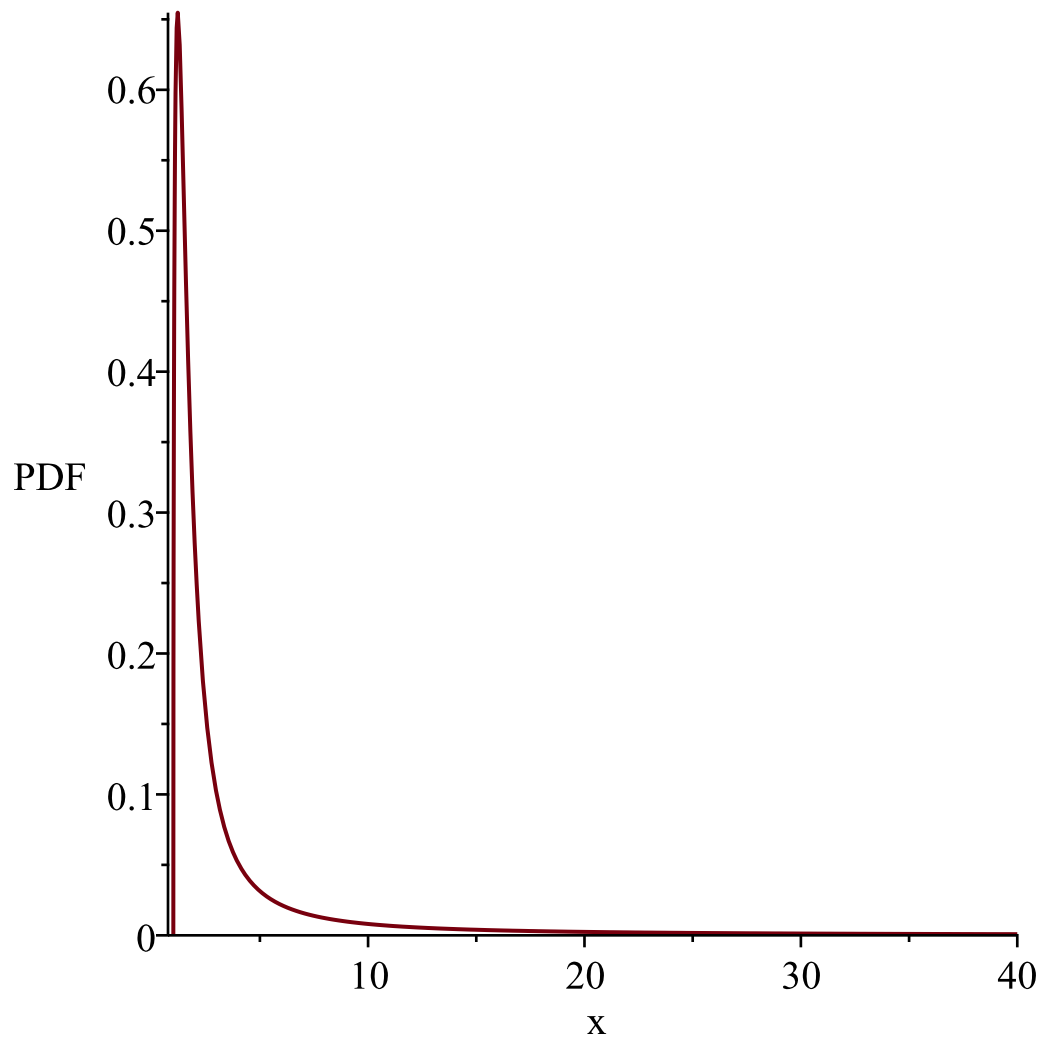
$$Temp := \left[ \left[ y \sim \rightarrow \frac{180 \sqrt{3} \sqrt{\operatorname{arccsch}\left(\frac{1}{y \sim - 1}\right)}}{\left(3 \operatorname{arccsch}\left(\frac{1}{y \sim - 1}\right) + 4\right)^{7/2} \sqrt{y \sim^2 - 2 y \sim + 2}}, [1, \infty], ["Continuous",$$

"PDF"]

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

1

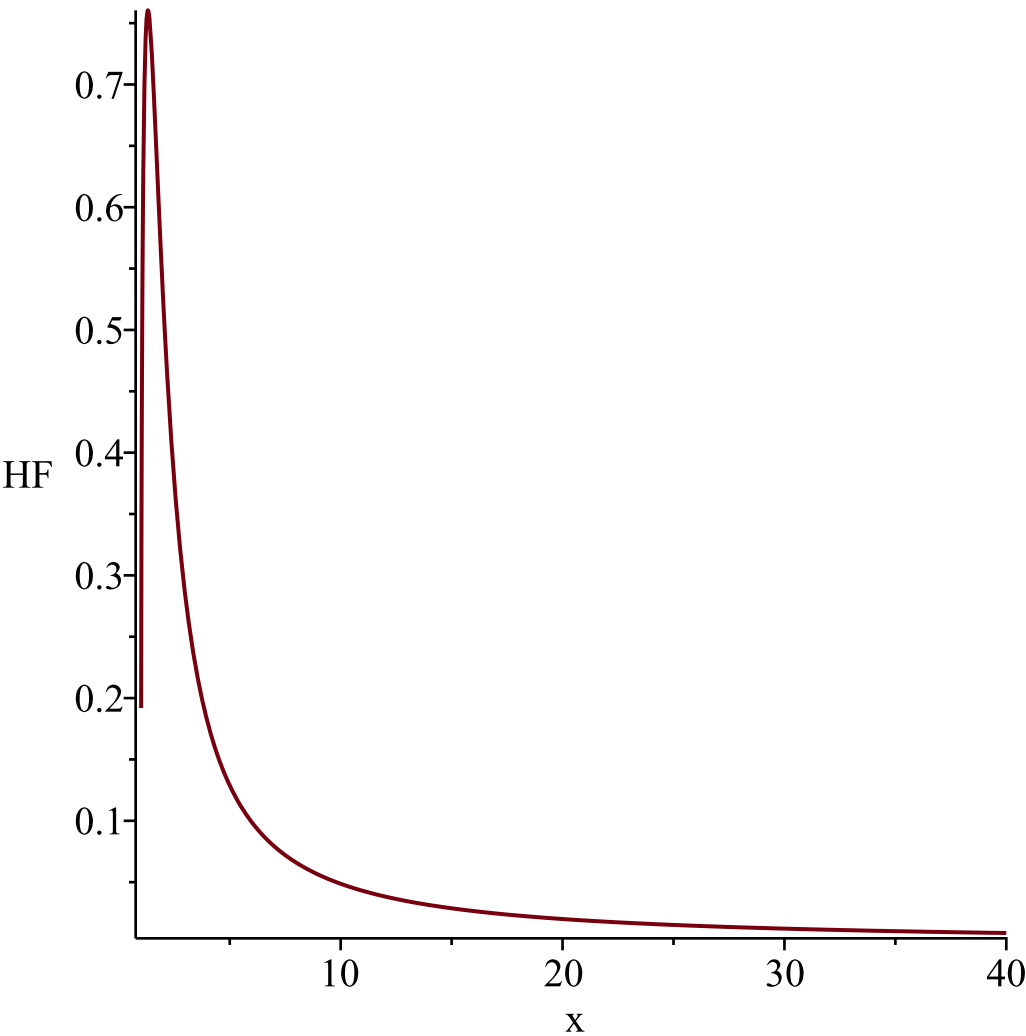
*Resetting low to RV's minimum support value*



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

1

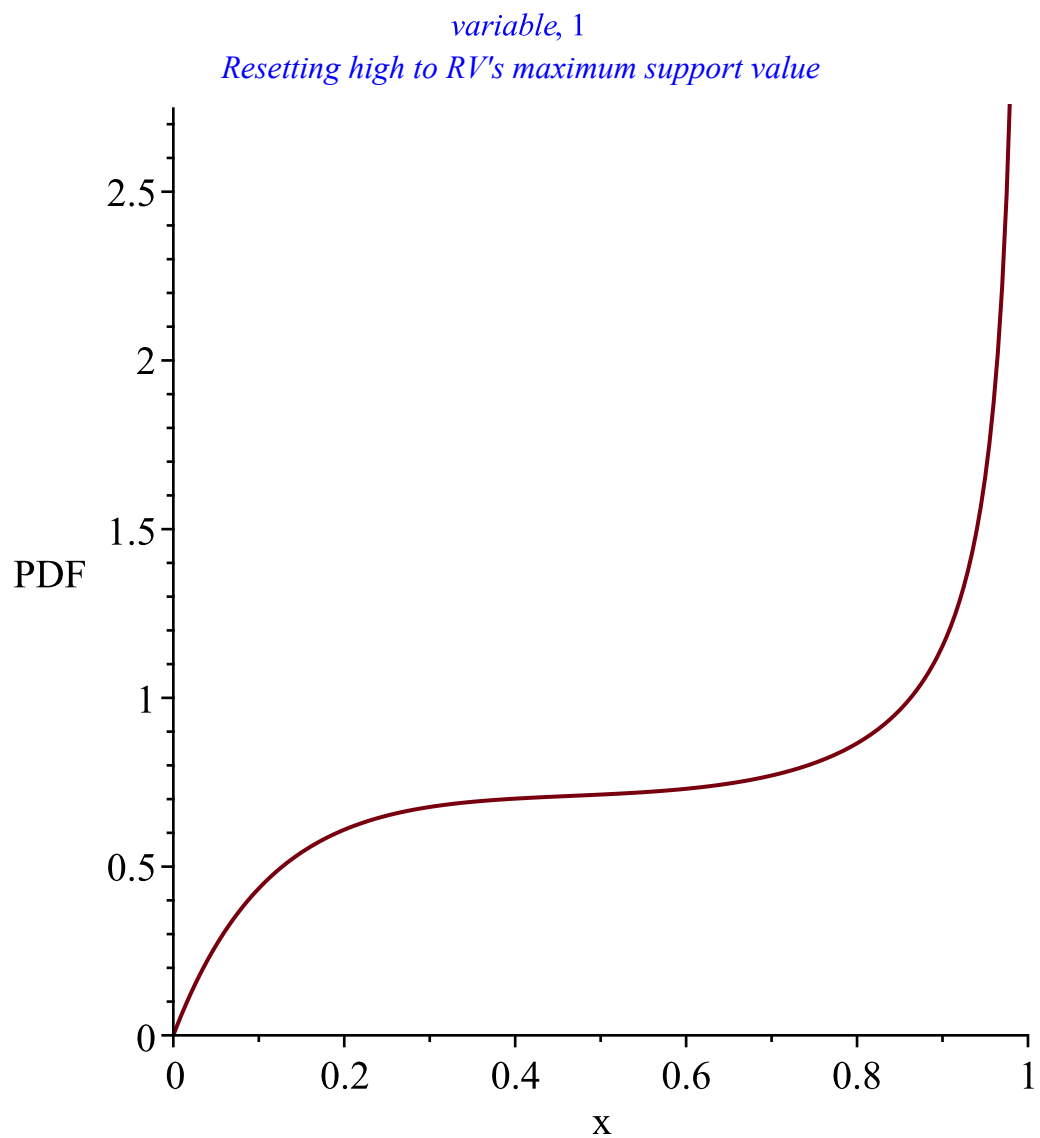
*Resetting low to RV's minimum support value*



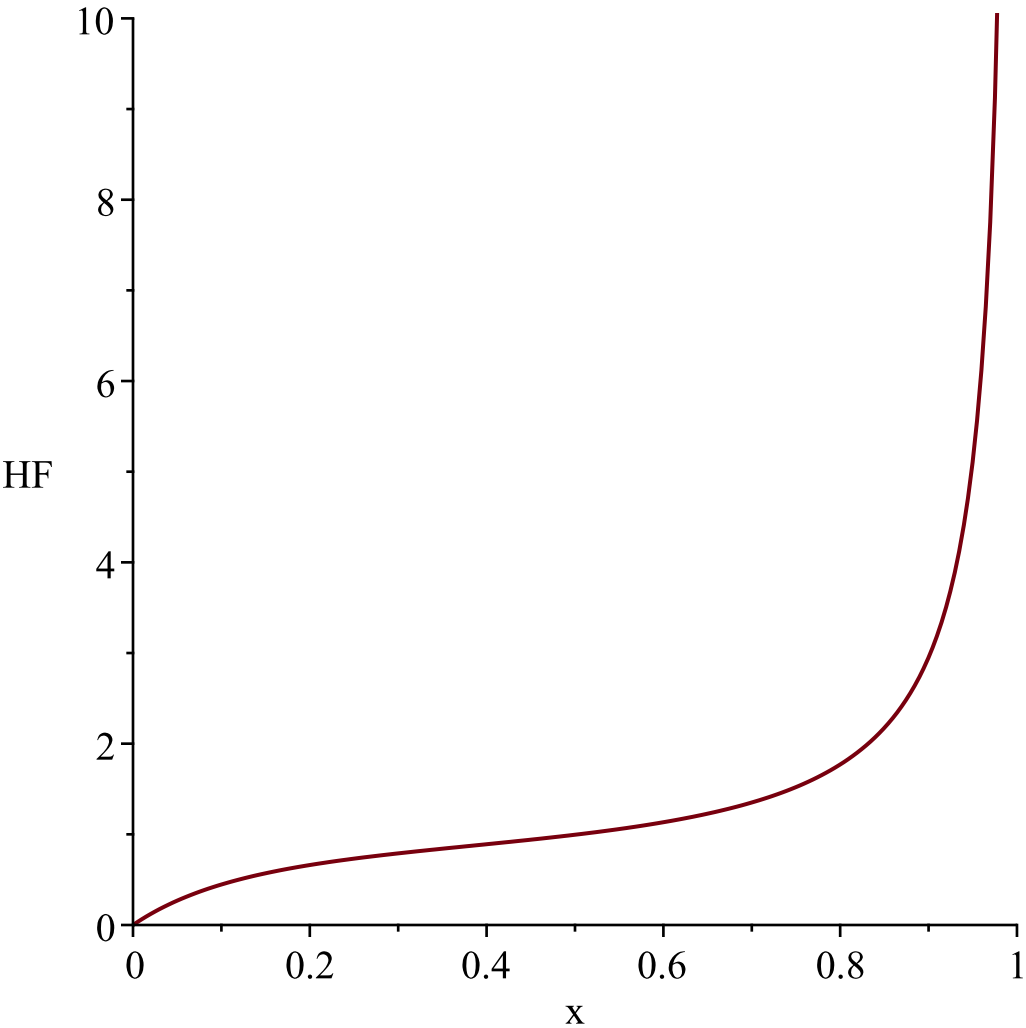
"i is", 20,  
 "-----"  
 "-----"

$$\begin{aligned}
 g &:= t \rightarrow \tanh\left(\frac{1}{t}\right) \\
 l &:= 0 \\
 u &:= \infty \\
 Temp &:= \left[ \left[ y \sim \rightarrow - \frac{180 \sqrt{3} \sqrt{\frac{1}{\operatorname{arctanh}(y \sim)}} \operatorname{arctanh}(y \sim)}{(3 + 4 \operatorname{arctanh}(y \sim))^3 \sqrt{\frac{3 + 4 \operatorname{arctanh}(y \sim)}{\operatorname{arctanh}(y \sim)}} (y \sim^2 - 1)} \right], [0, 1], \right. \\
 &\quad \left. ["Continuous", "PDF"] \right]
 \end{aligned}$$

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



*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*



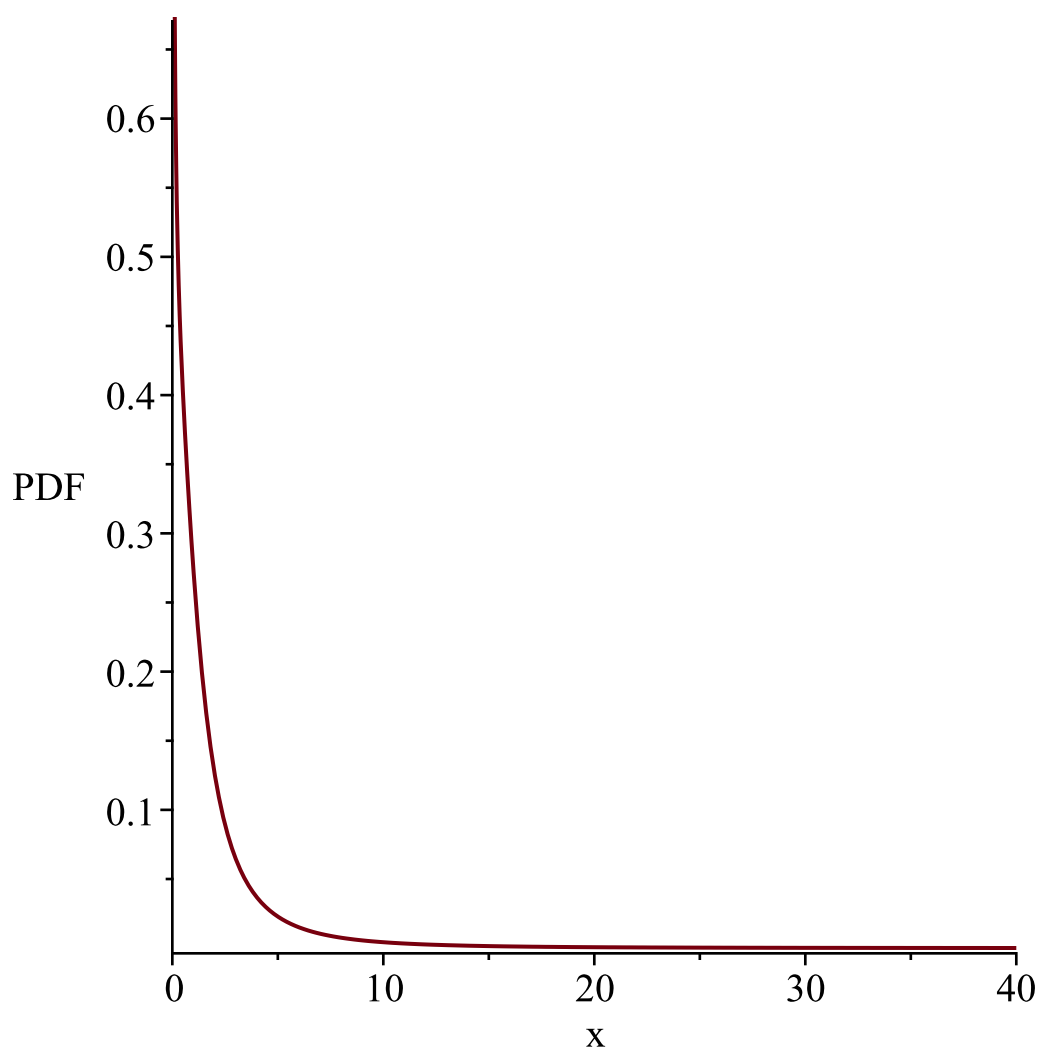
"i is", 21,  
 " \_\_\_\_\_"  
 "\_\_\_\_\_"

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

$$l:=0$$

$$u:=\infty$$

$$Temp:=\left[\left[y\!\sim\!\rightarrow\!\frac{180\,\sqrt{3}\,\sqrt{\operatorname{arccsch}(y\!\sim)}}{(3+4\,\operatorname{arccsch}(y\!\sim))^3\sqrt{\frac{3+4\,\operatorname{arccsch}(y\!\sim)}{\operatorname{arccsch}(y\!\sim)}}\sqrt{y\!\sim^2+1}\,|y\!\sim|}\right],[0,\,\infty],\right.\\
\left.["Continuous",\, "PDF"]\right]$$



Warning, computation interrupted