

```
> 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 := ArcTanRV(2,3);
bfname := "ArcTanRV(2,3)";
bf := 
$$\left[ x \rightarrow \frac{2}{\left( \arctan(6) + \frac{1}{2} \pi \right) (1 + 4(x-3)^2)} \right], [0, \infty], ["Continuous", "PDF"]$$

bfname := "ArcTanRV(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 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

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

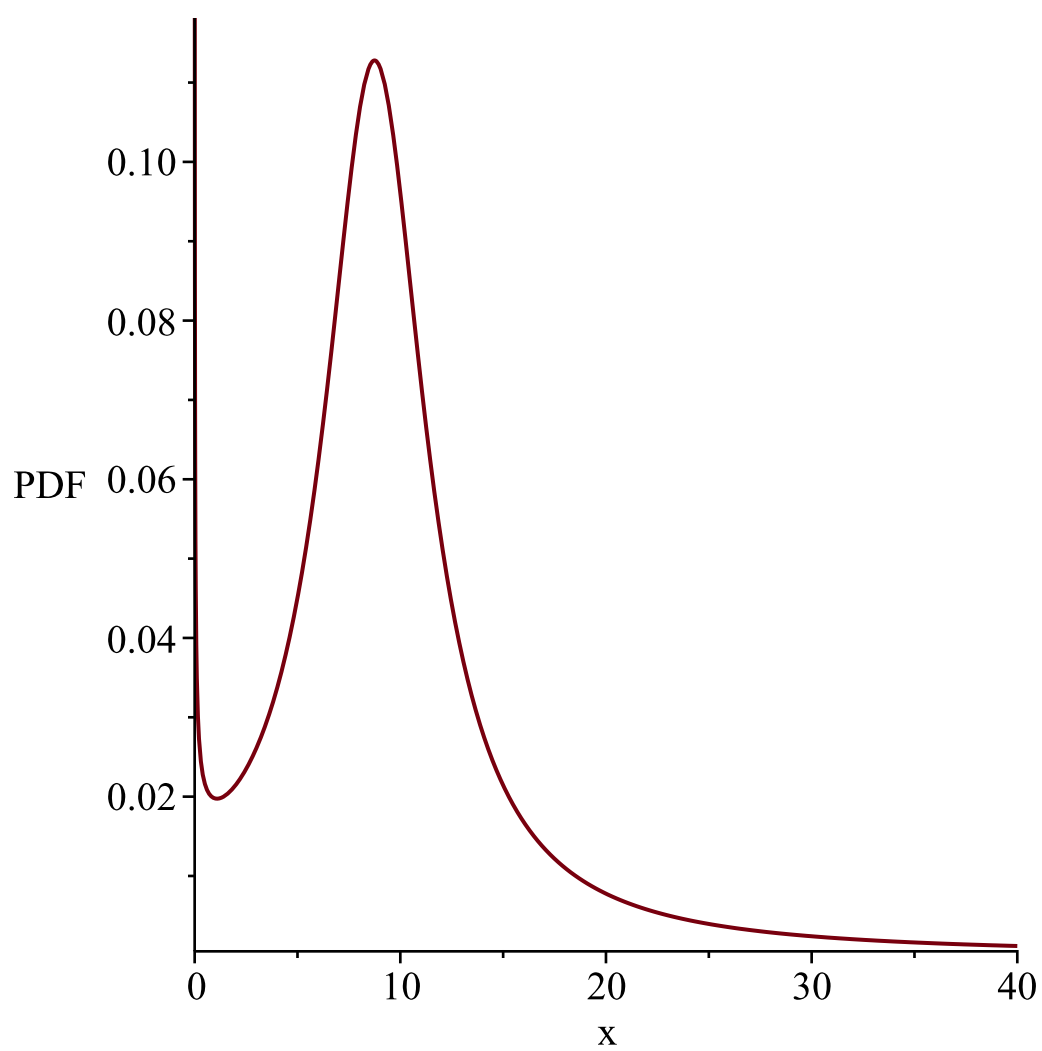
od;
```

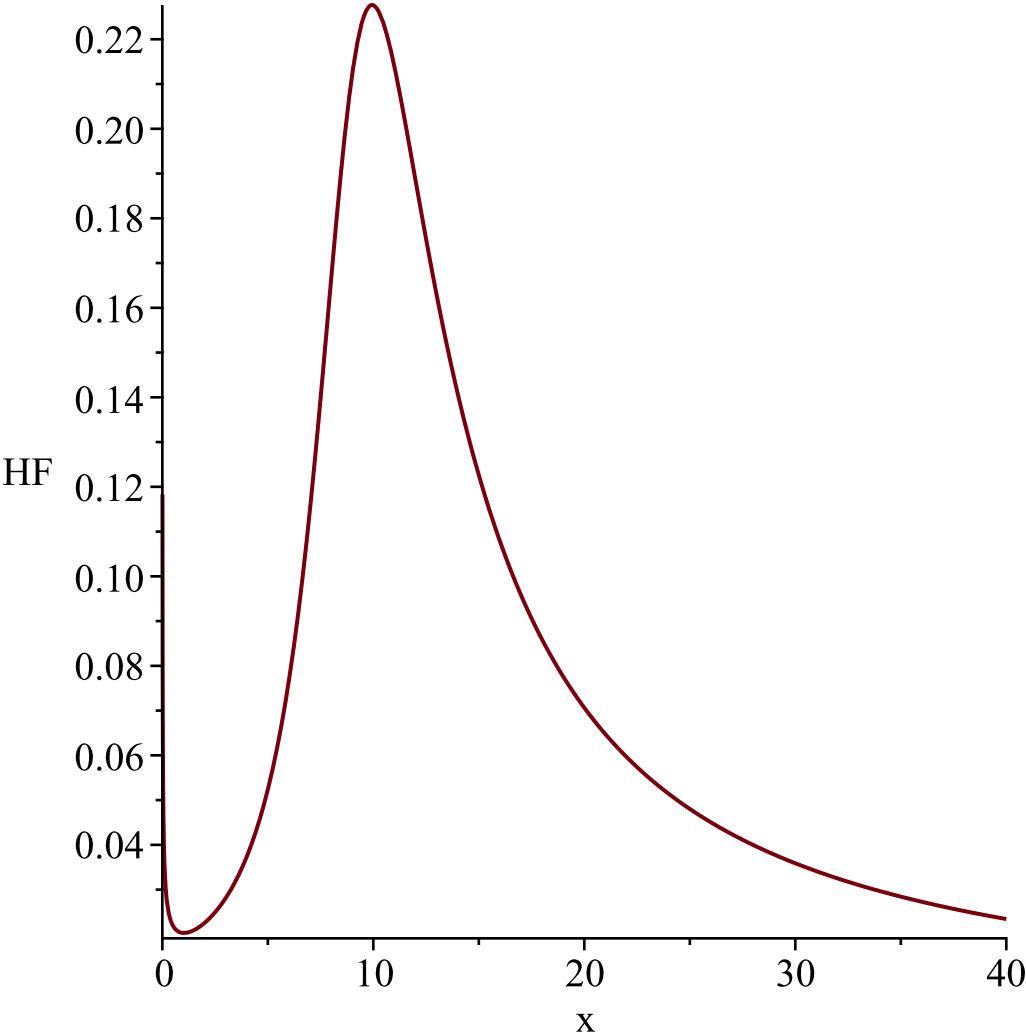
$filename := "C:/LatexOutput/Trash.tex"$

$$\frac{2}{\left(\arctan(6) + \frac{1}{2} \pi\right) (1 + 4 (x - 3)^2)}$$

```
"i is", 1,
" -----"
-----"
```

$$g := t \rightarrow t^2$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y \rightarrow - \frac{2}{(2 \arctan(6) + \pi) (-4 y + 24 \sqrt{y} - 37) \sqrt{y}} \right], [0, \infty], \right. \\ \left. ["Continuous", "PDF"] \right]$$

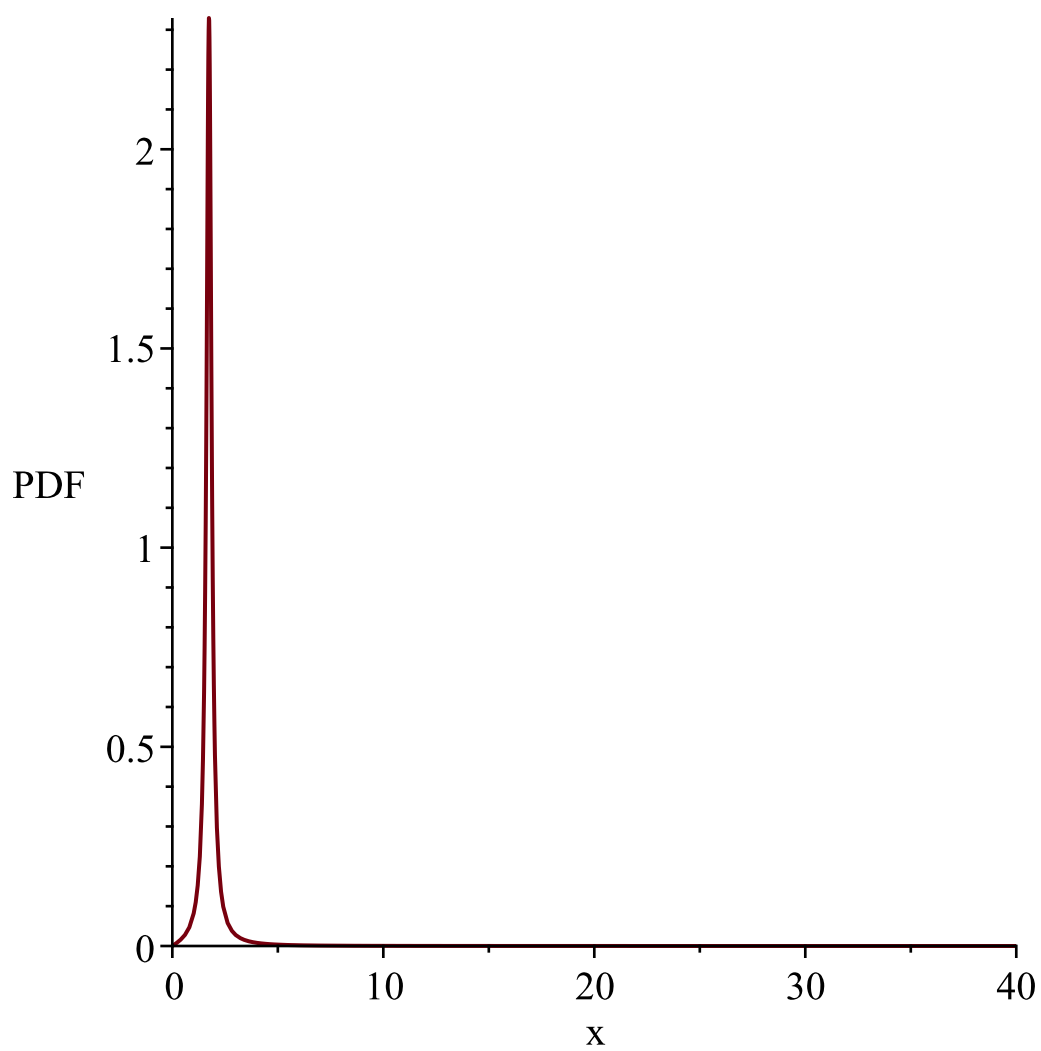


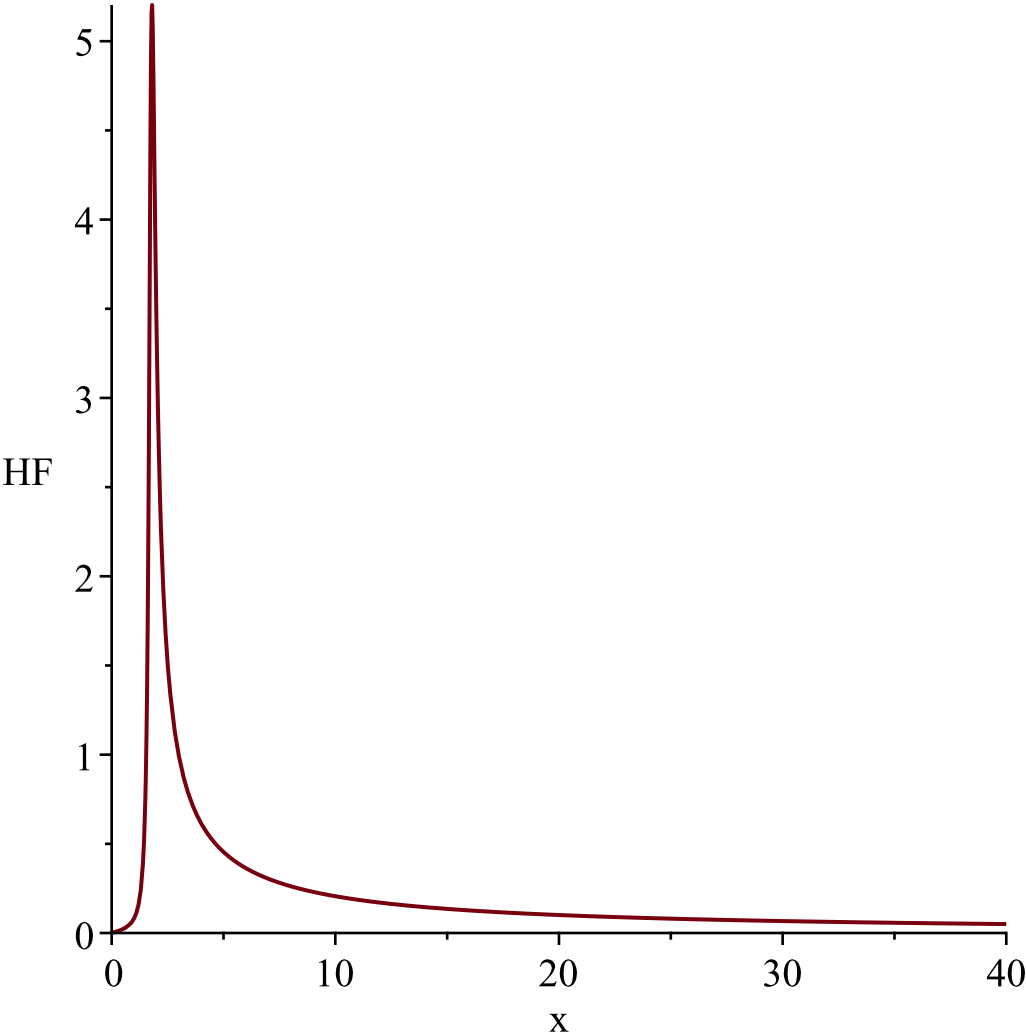


"i is", 2,
"-----"
-----"

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

$$Temp := \left[\left[y \rightsquigarrow \frac{8\,y}{(2\arctan(6) + \pi)\,(4\,y^4 - 24\,y^2 + 37)} \right], [0, \infty], ["Continuous", "PDF"] \right]$$





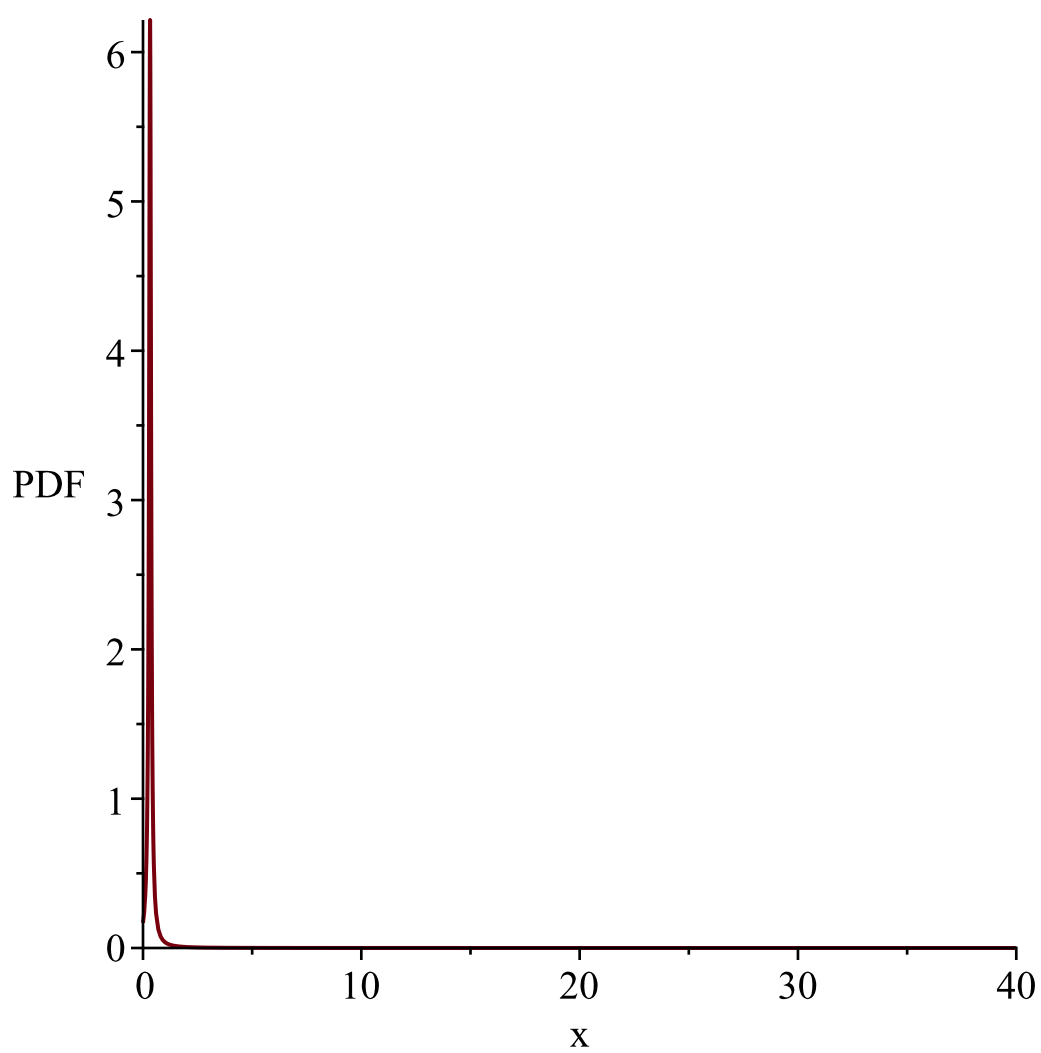
"i is", 3,
" _____"
"_____"

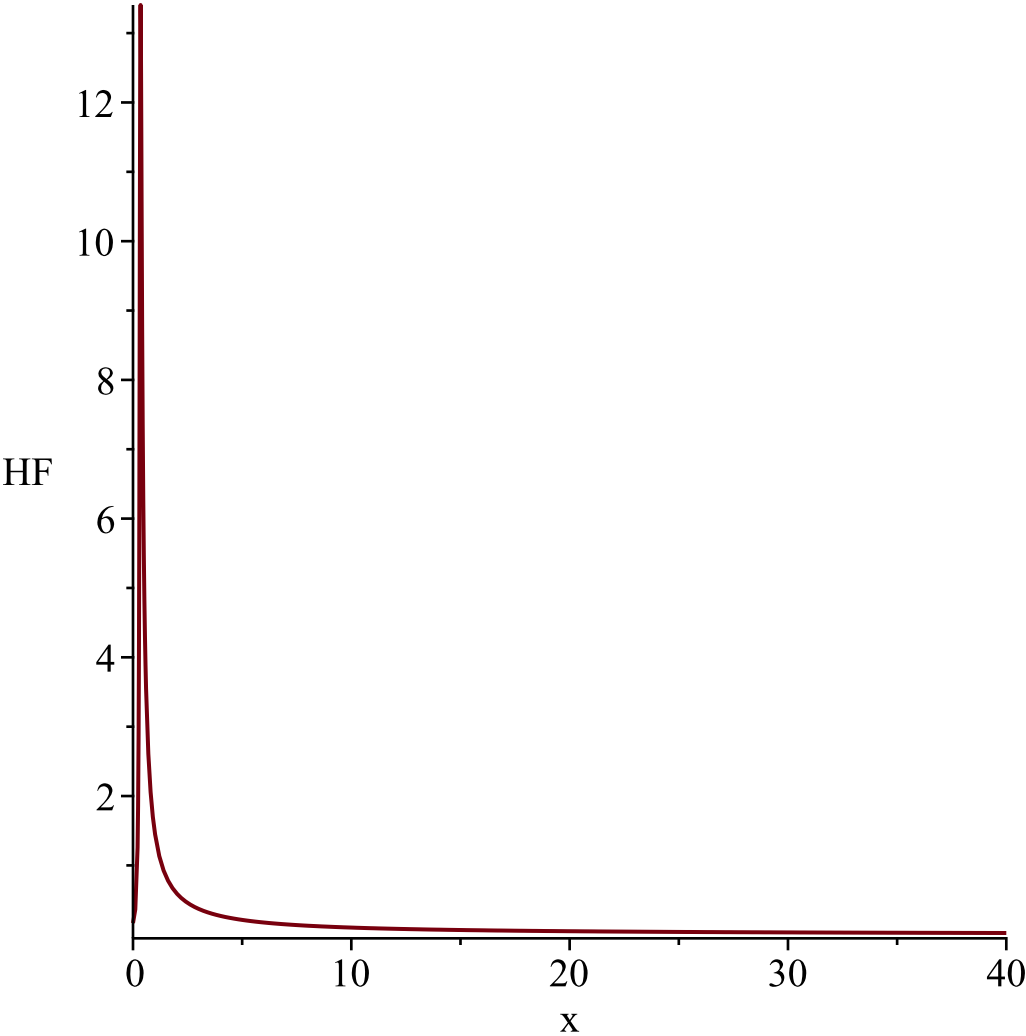
$$g:=t\rightarrow \frac{1}{t}$$

$$l:=0$$

$$u:=\infty$$

$$Temp:=\left[\left[y\sim\rightarrow\frac{4}{\left(2\arctan(6)+\pi\right)\left(37\,y\sim^2-24\,y\sim+4\right)}\right],[0,\infty],[\text{"Continuous"},\text{"PDF"}]\right]$$

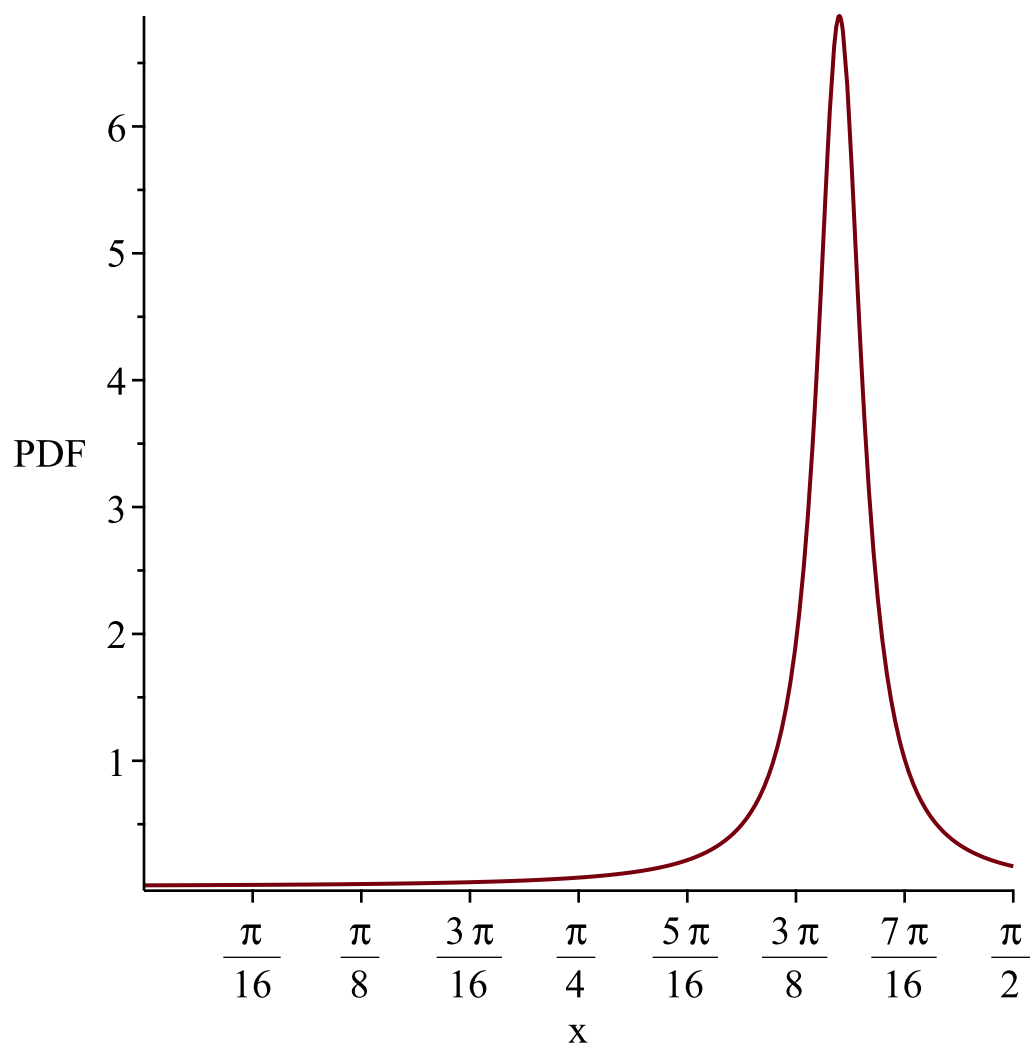




"i is", 4,
"-----"
-----"

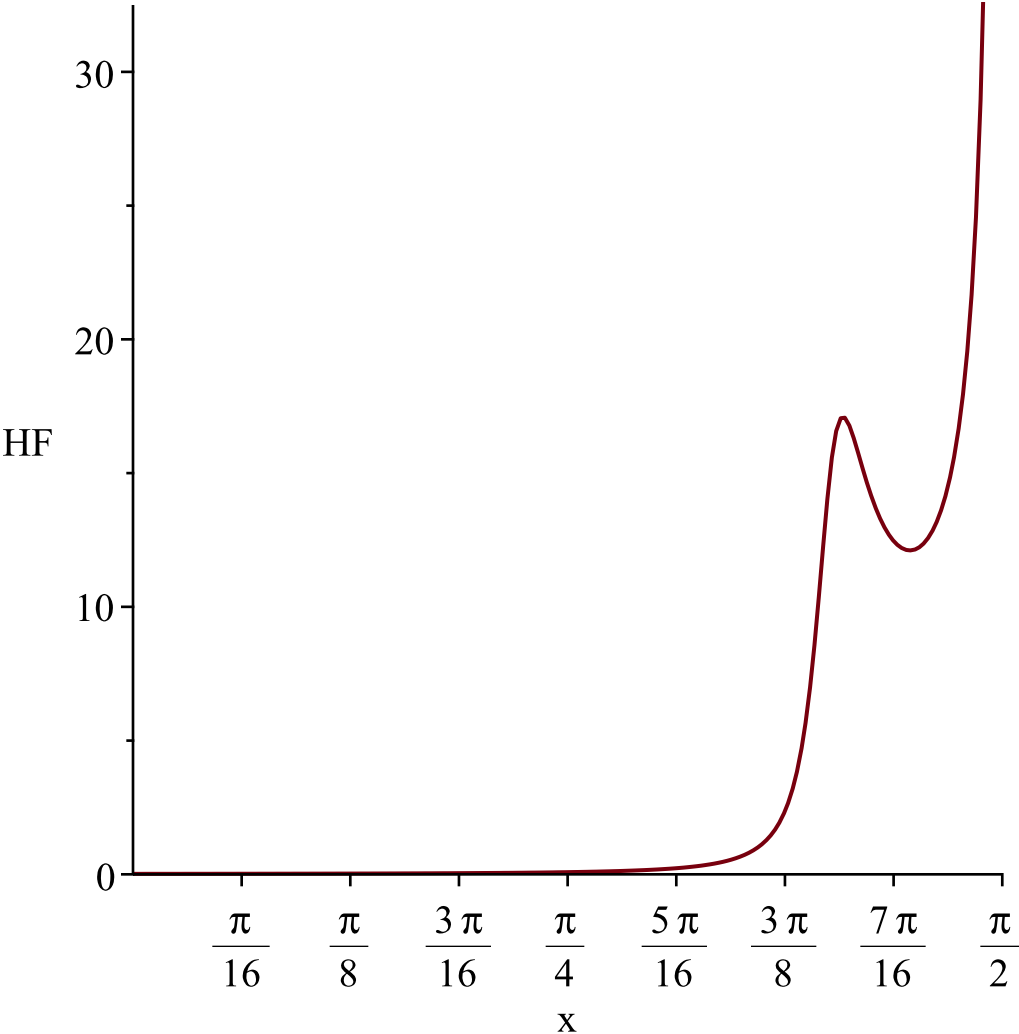
```
g := t→arctan(t)
l := 0
u := ∞
Temp := ⌈⌊y~→ - 4 / (2 arctan(6) + π) (24 sin(y~) cos(y~) - 33 cos(y~)2 - 4) ⌋, ⌈0, 1/2 π⌋,
["Continuous", "PDF"]
```

*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random
variable, 1/2 π
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, $\frac{1}{2} \pi$*

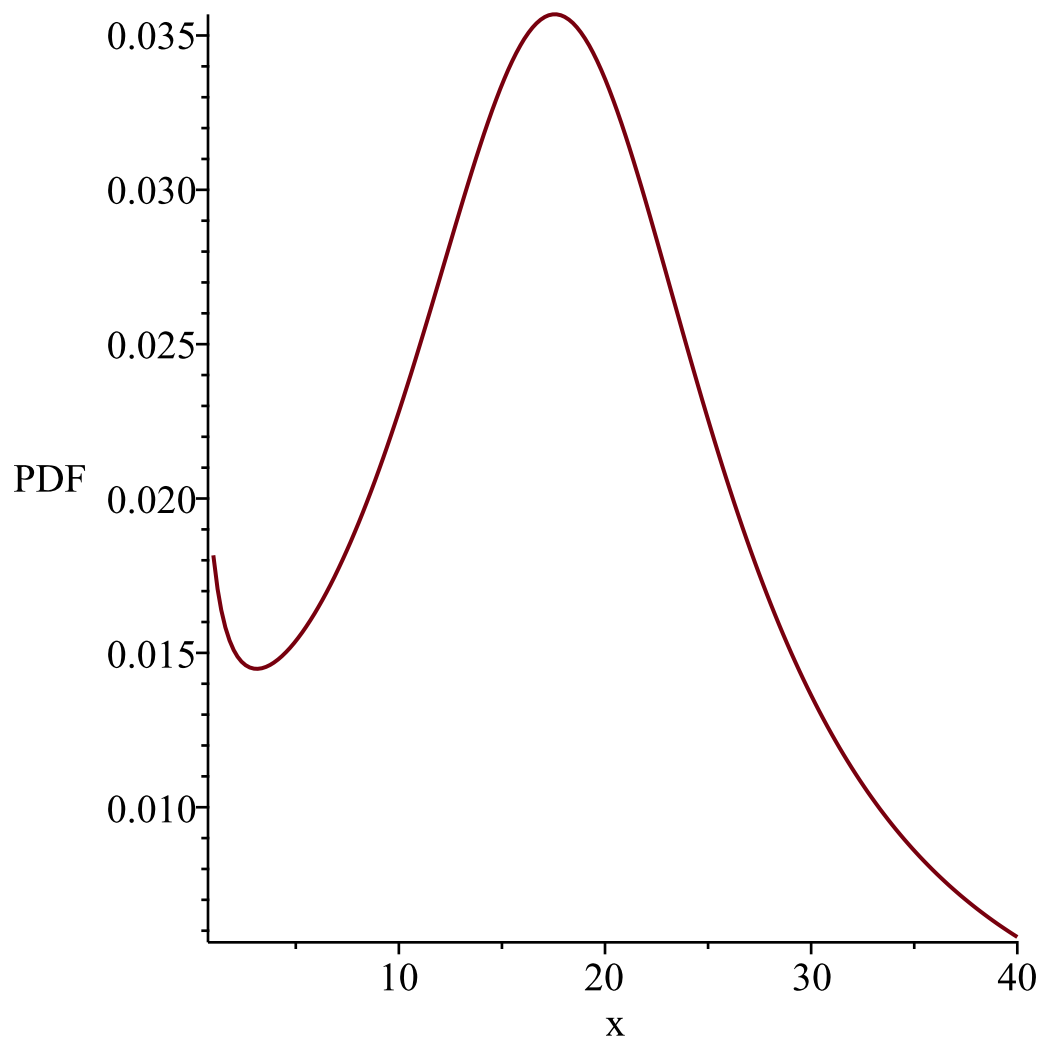
Resetting high to RV's maximum support value



"i is", 5,
"-----"
-----"

$$g := t \rightarrow e^t$$
$$l := 0$$
$$u := \infty$$
$$Temp := \left[\left[y \rightarrow \frac{4}{(2 \arctan(6) + \pi) (4 \ln(y)^2 - 24 \ln(y) + 37) y}, [1, \infty], \right. \right. \\ \left. \left. ["Continuous", "PDF"] \right] \right]$$

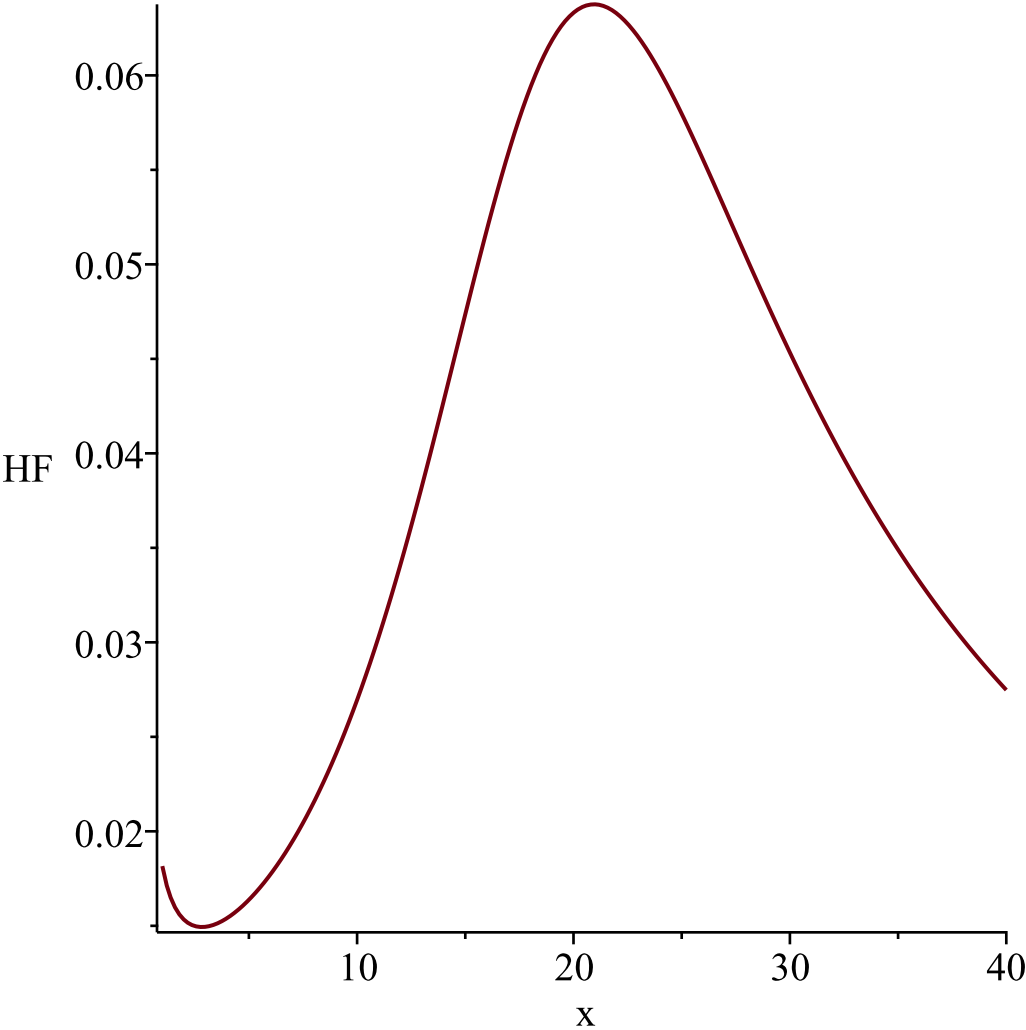
*WARNING(PlotDist): Low value provided by user, 0
is less than minimum support value of random variable*
1
Resetting low to RV's minimum support value



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

1

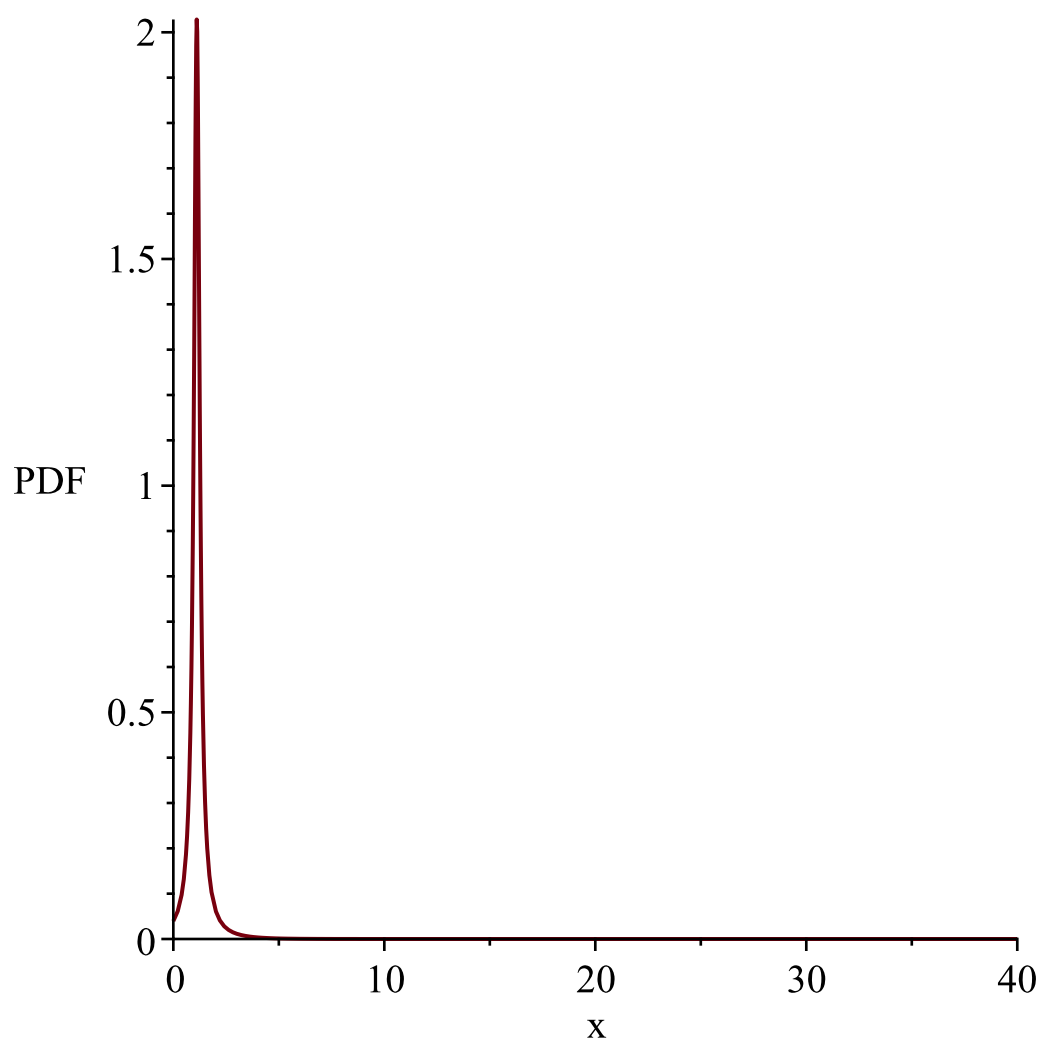
Resetting low to RV's minimum support value

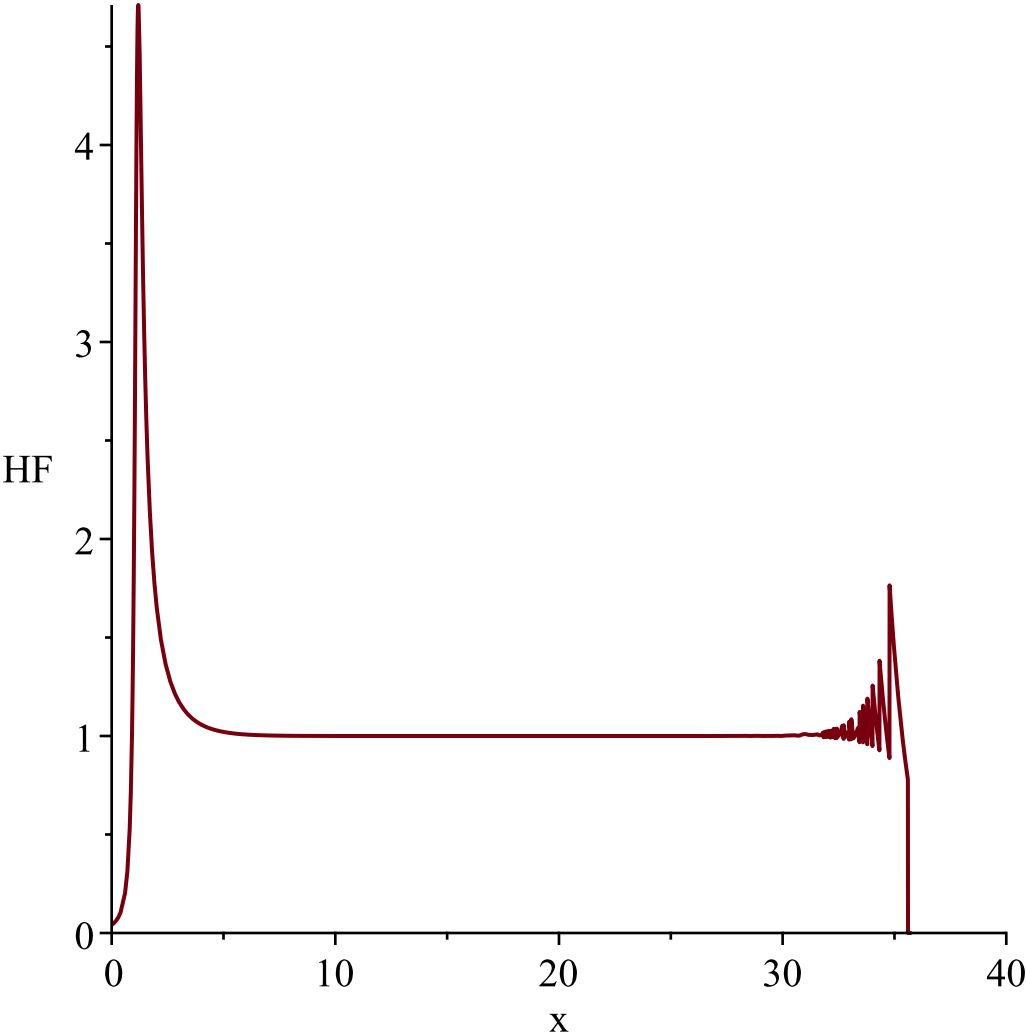


"i is", 6,
"-----"
-----"

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

$$Temp := \left[\left[y_{\sim} \rightarrow \frac{4 \, e^{y_{\sim}}}{(2 \arctan(6) + \pi) \, (4 \, e^{2 y_{\sim}} - 24 \, e^{y_{\sim}} + 37)} \right], [-\infty, \infty], ["Continuous", "PDF"] \right]$$

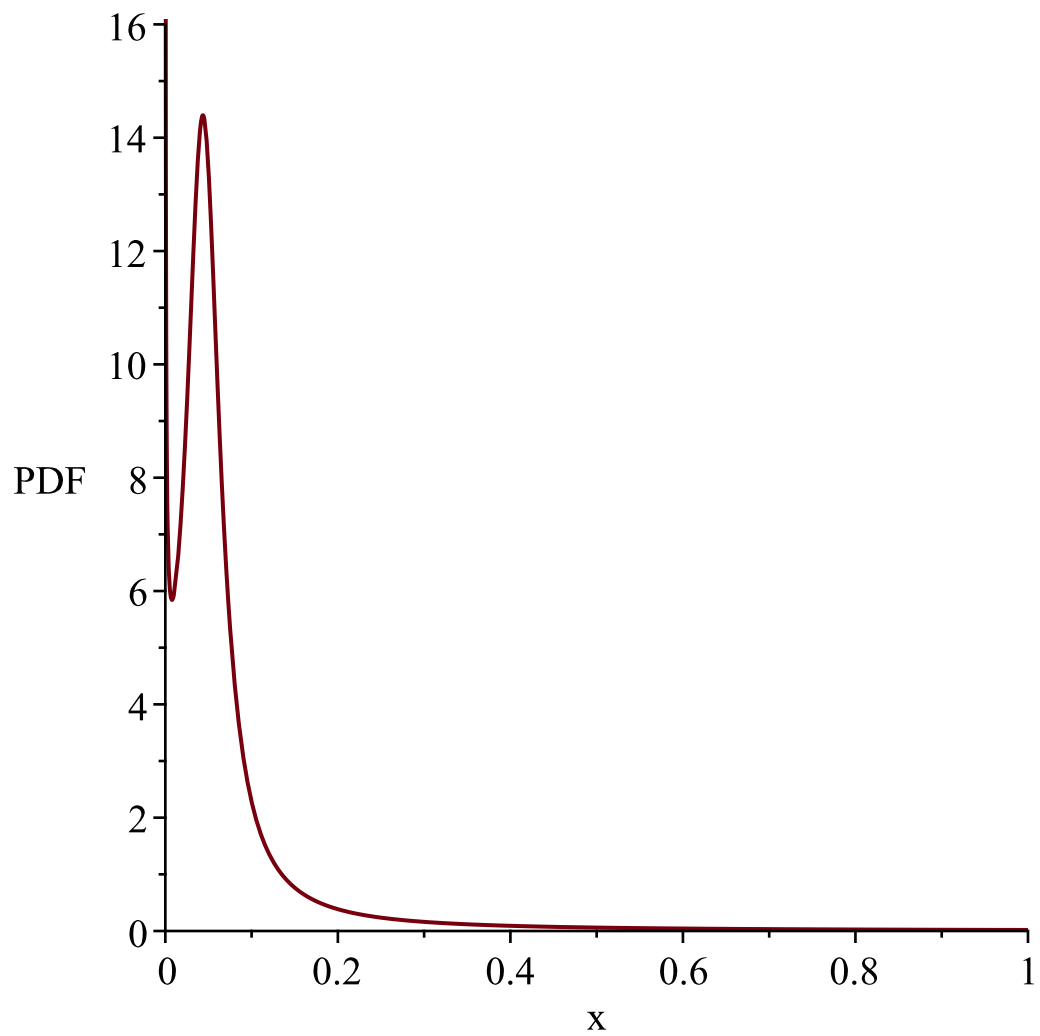




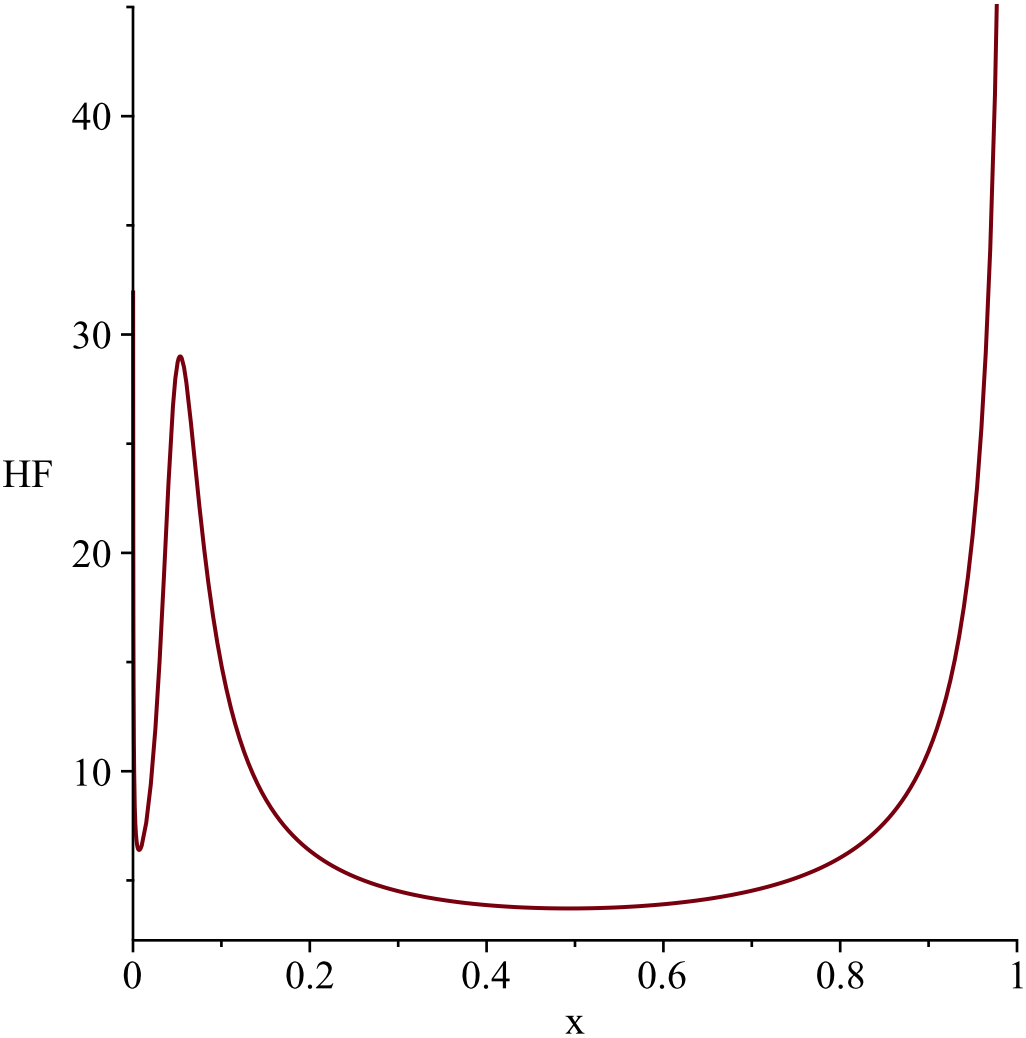
"i is", 7,
"-----"
"-----"

$$\begin{aligned} g &:= t \rightarrow e^{-t} \\ l &:= 0 \\ u &:= \infty \\ Temp &:= \left[\left[y \sim \rightarrow \frac{4}{(2 \arctan(6) + \pi) (4 \ln(y \sim)^2 + 24 \ln(y \sim) + 37) y \sim} \right], [0, 1], \right. \\ &\quad \left. ["Continuous", "PDF"] \right] \end{aligned}$$

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



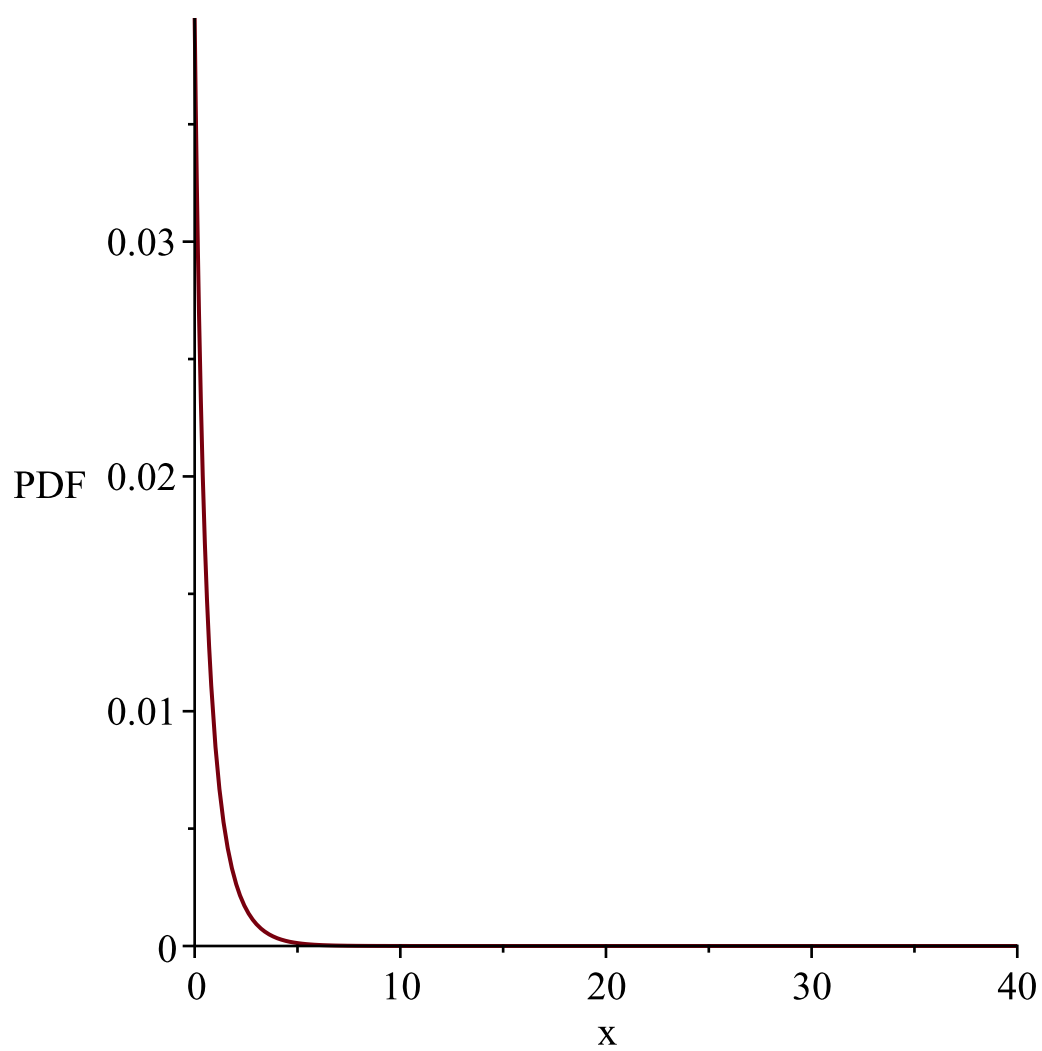
*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random
variable, 1
Resetting high to RV's maximum support value*

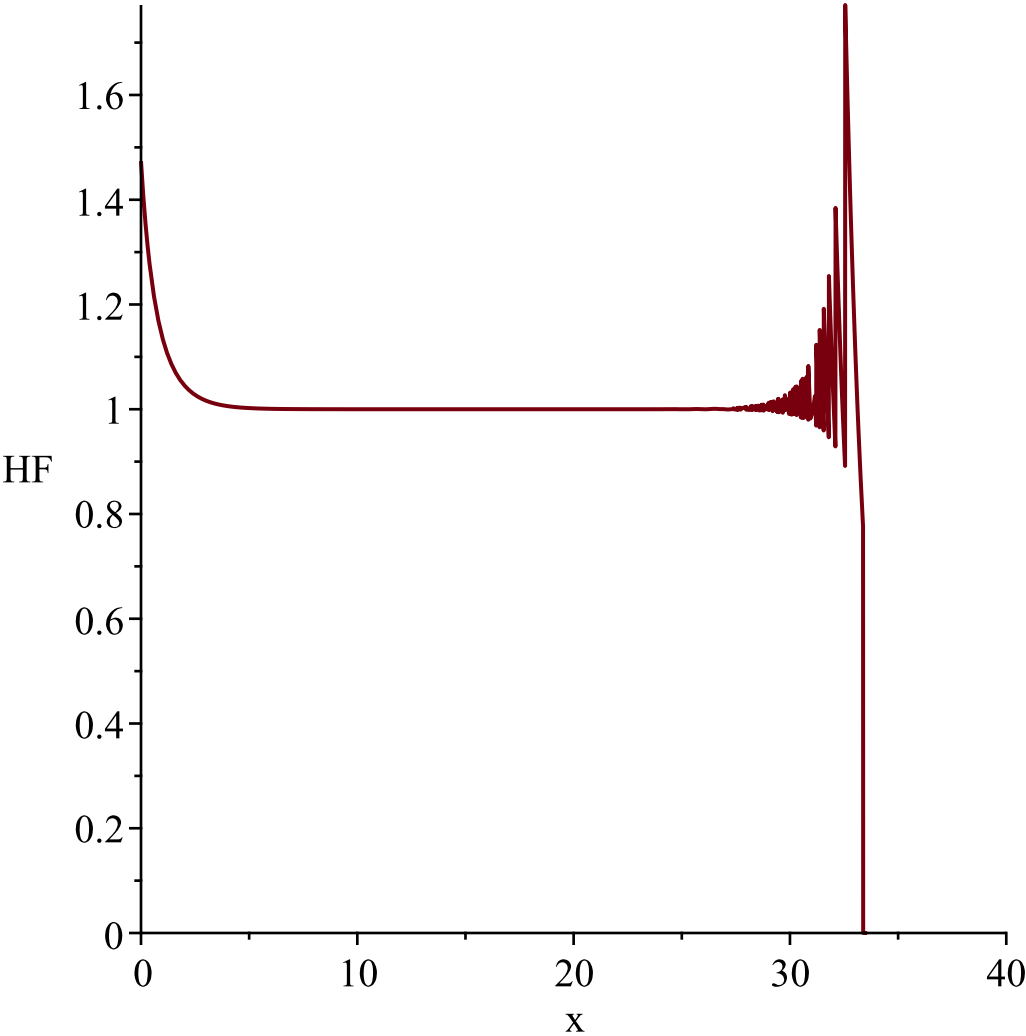


"i is", 8,
"-----"
-----"

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

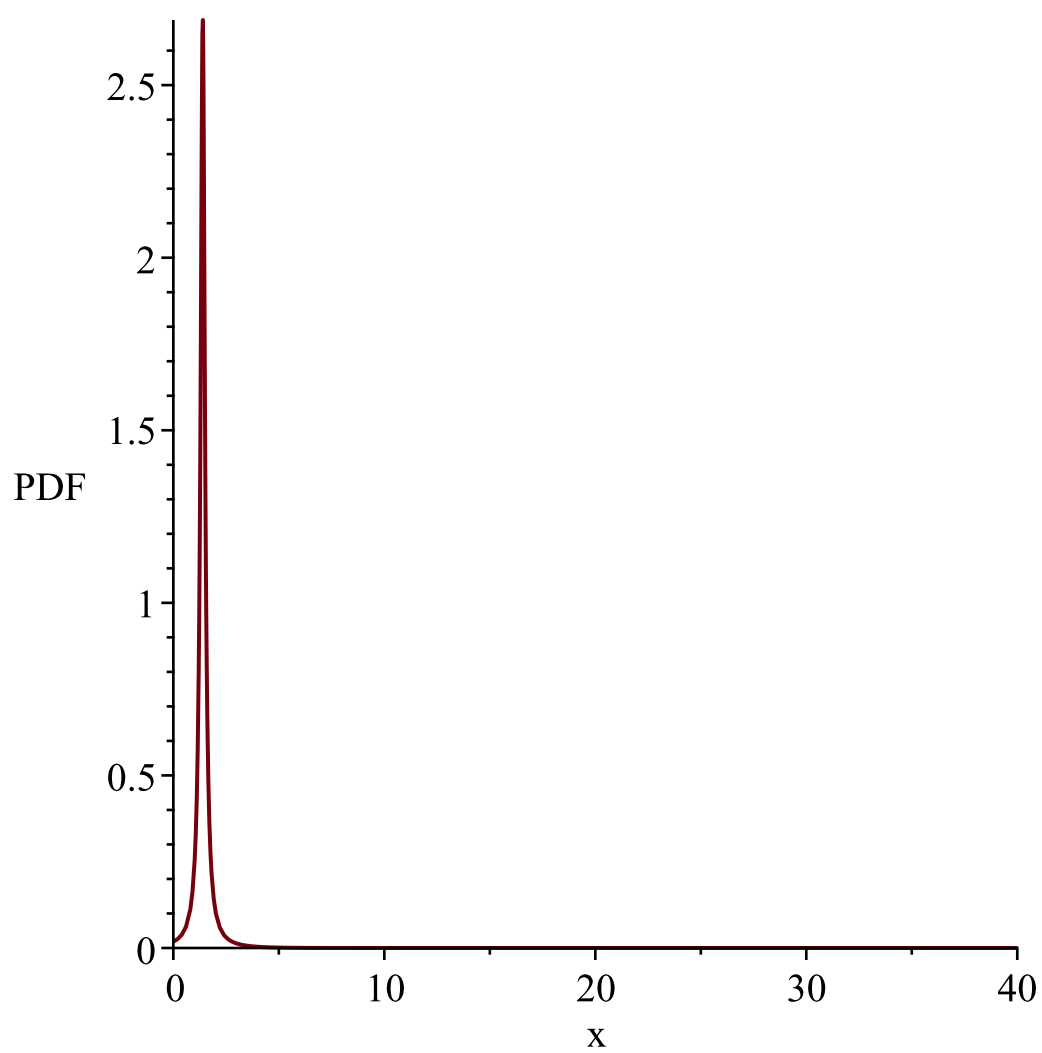
$$Temp := \left[\left[y_{\sim} \rightarrow - \frac{4 \, e^{y_{\sim}}}{(2 \arctan(6) + \pi) \, (-37 \, e^{2 y_{\sim}} + 24 \, e^{y_{\sim}} - 4)} \right], [- \infty, \infty], ["Continuous", "PDF"] \right]$$

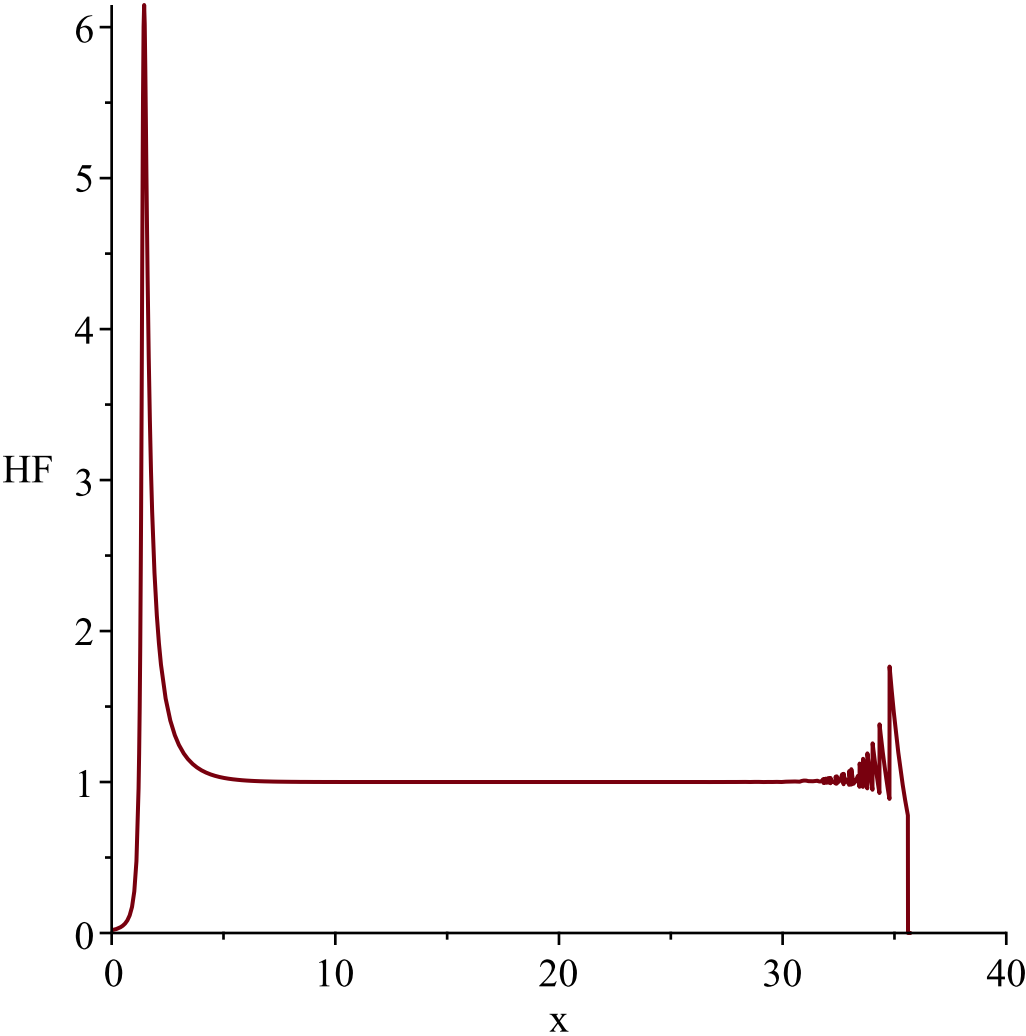




"i is", 9,
"-----"
-----"

$$\begin{aligned} g &:= t \rightarrow \ln(t+1) \\ l &:= 0 \\ u &:= \infty \\ Temp &:= \left[\left[y_{\sim} \rightarrow - \frac{4 \, e^{y_{\sim}}}{(2 \arctan(6) + \pi) \, (-4 \, e^{2 y_{\sim}} + 32 \, e^{y_{\sim}} - 65)} \right], [0, \infty], ["Continuous", \right. \\ &\quad \left. "PDF"] \right] \end{aligned}$$





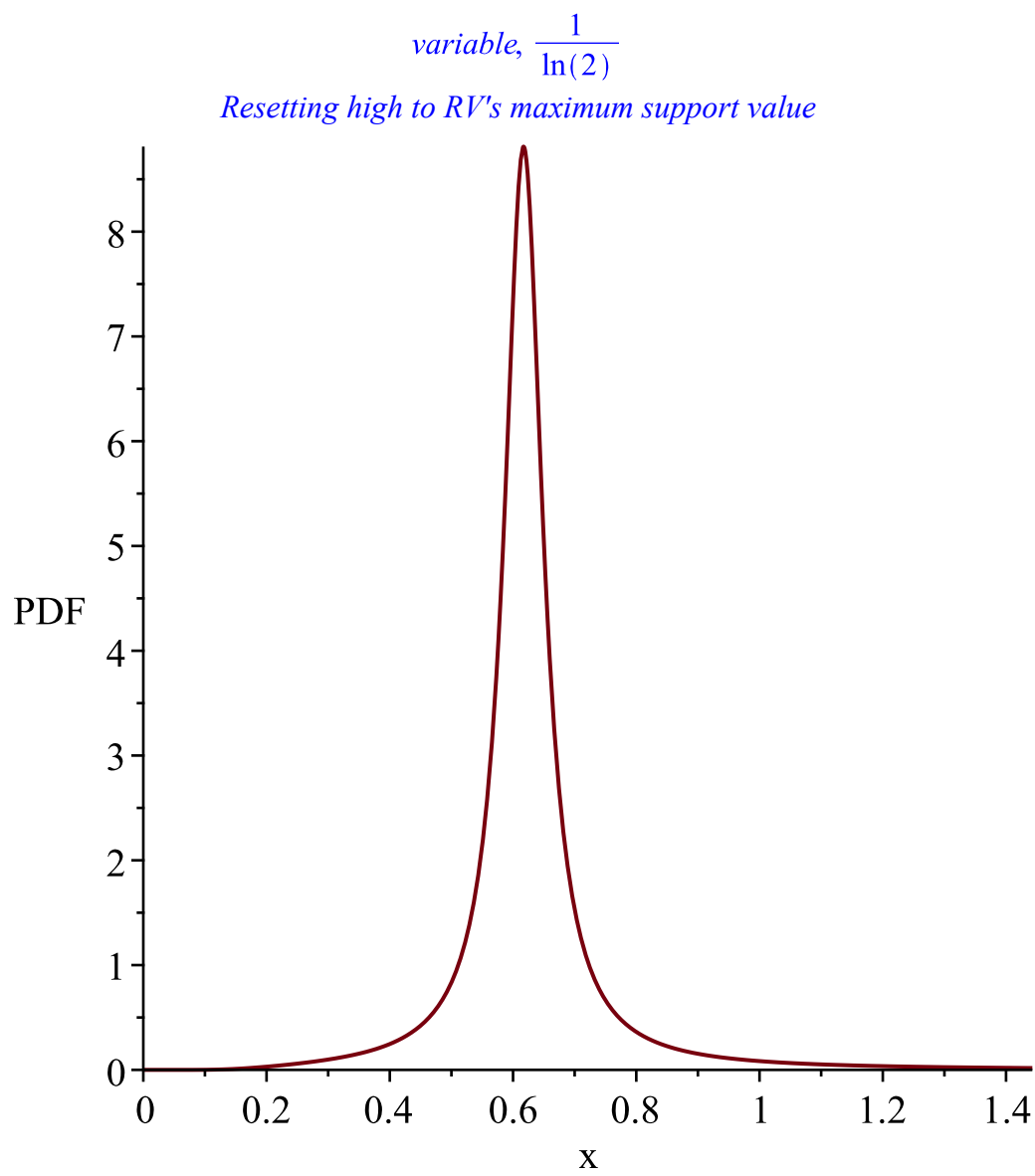
"i is", 10,
"-----"
-----"

$$g := t \rightarrow \frac{1}{\ln(t + 2)}$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y \sim \rightarrow - \frac{4 \, e^{\frac{1}{y \sim}}}{(2 \arctan(6) + \pi) \left(-4 \, e^{\frac{2}{y \sim}} + 40 \, e^{\frac{1}{y \sim}} - 101 \right) y \sim^2} \right], \left[0, \frac{1}{\ln(2)} \right] \right]$$

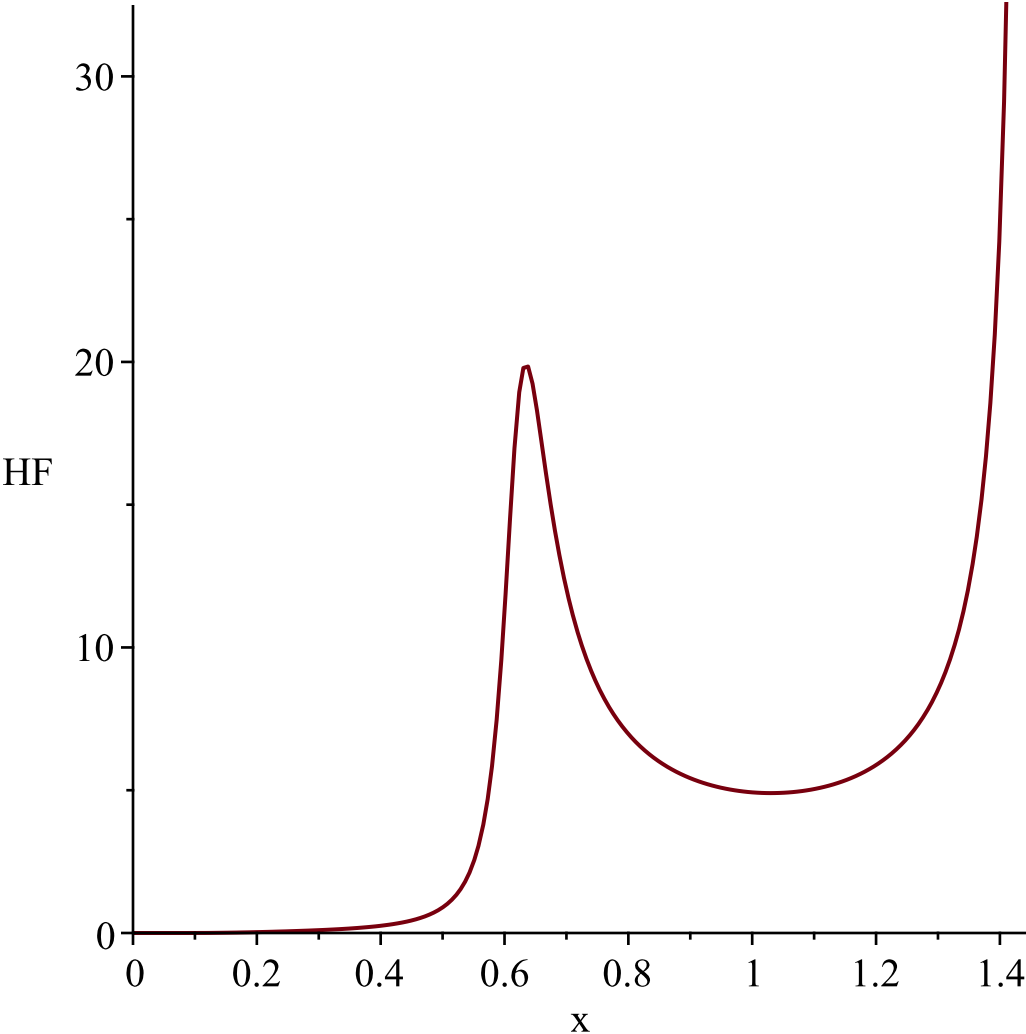
$$["Continuous", "PDF"]$$

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

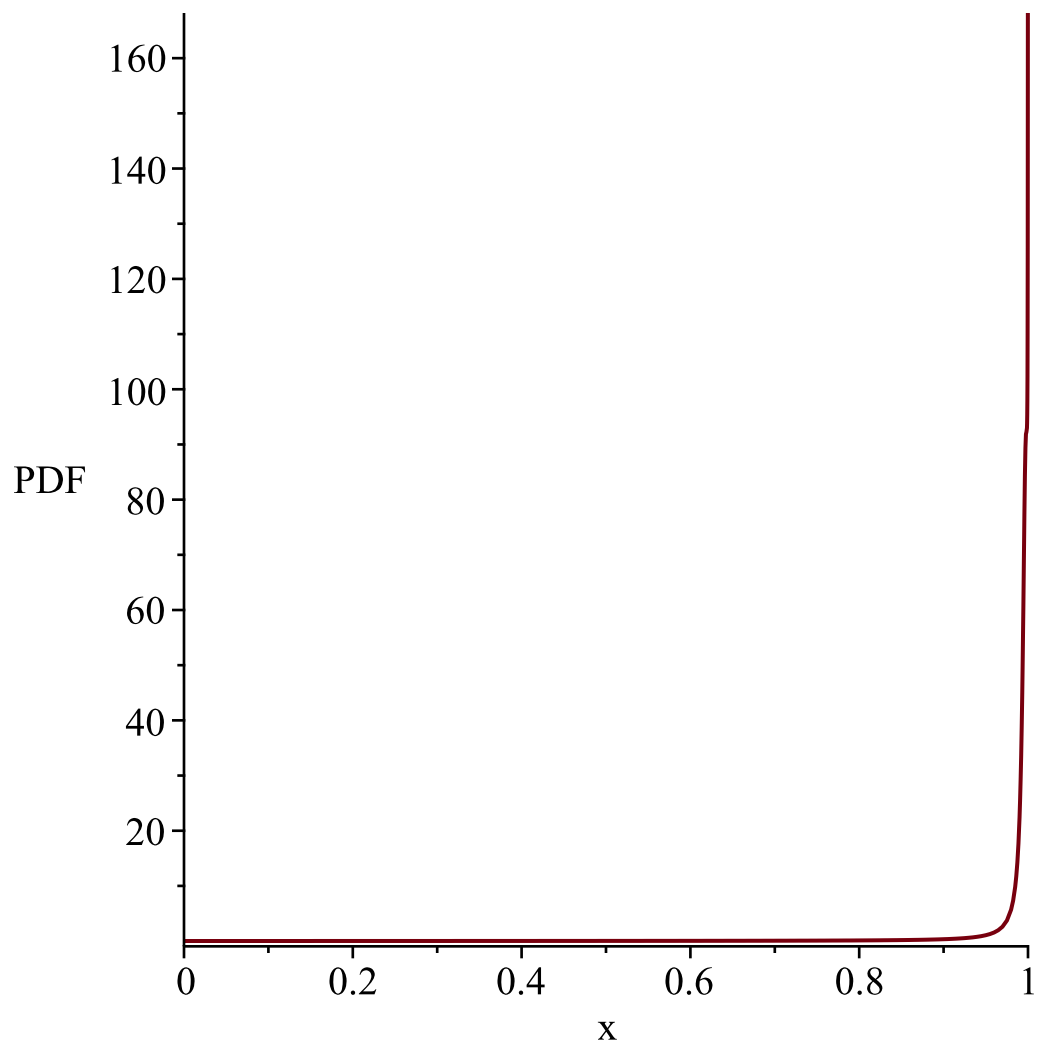


"i is", 11,
"-----"
-----"

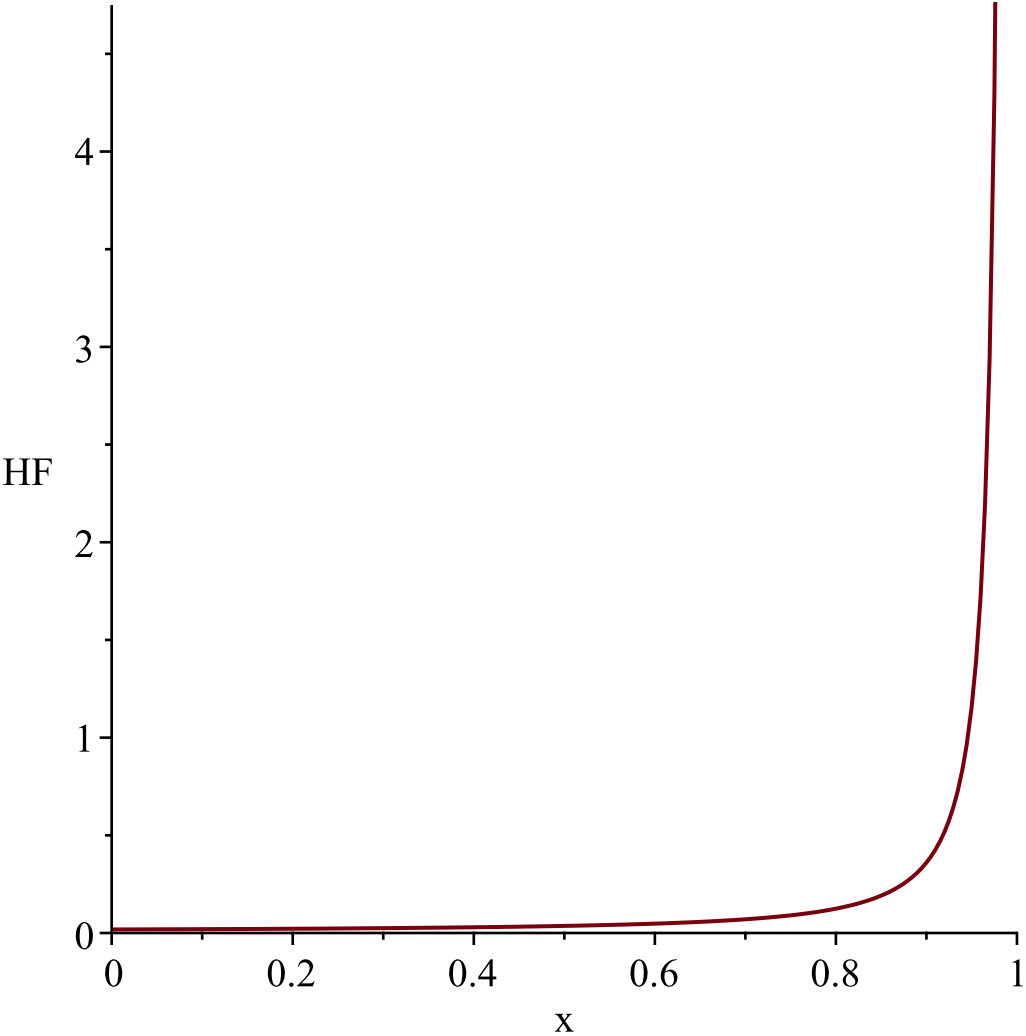
$$g := t \rightarrow \tanh(t)$$
$$l := 0$$
$$u := \infty$$

$$Temp := \left[\left[y \rightsquigarrow - \frac{4}{(2 \arctan(6) + \pi) (4 \operatorname{arctanh}(y \sim)^2 - 24 \operatorname{arctanh}(y \sim) + 37) (y \sim^2 - 1)} \right], \right. \\ \left. [0, 1], ["Continuous", "PDF"] \right]$$

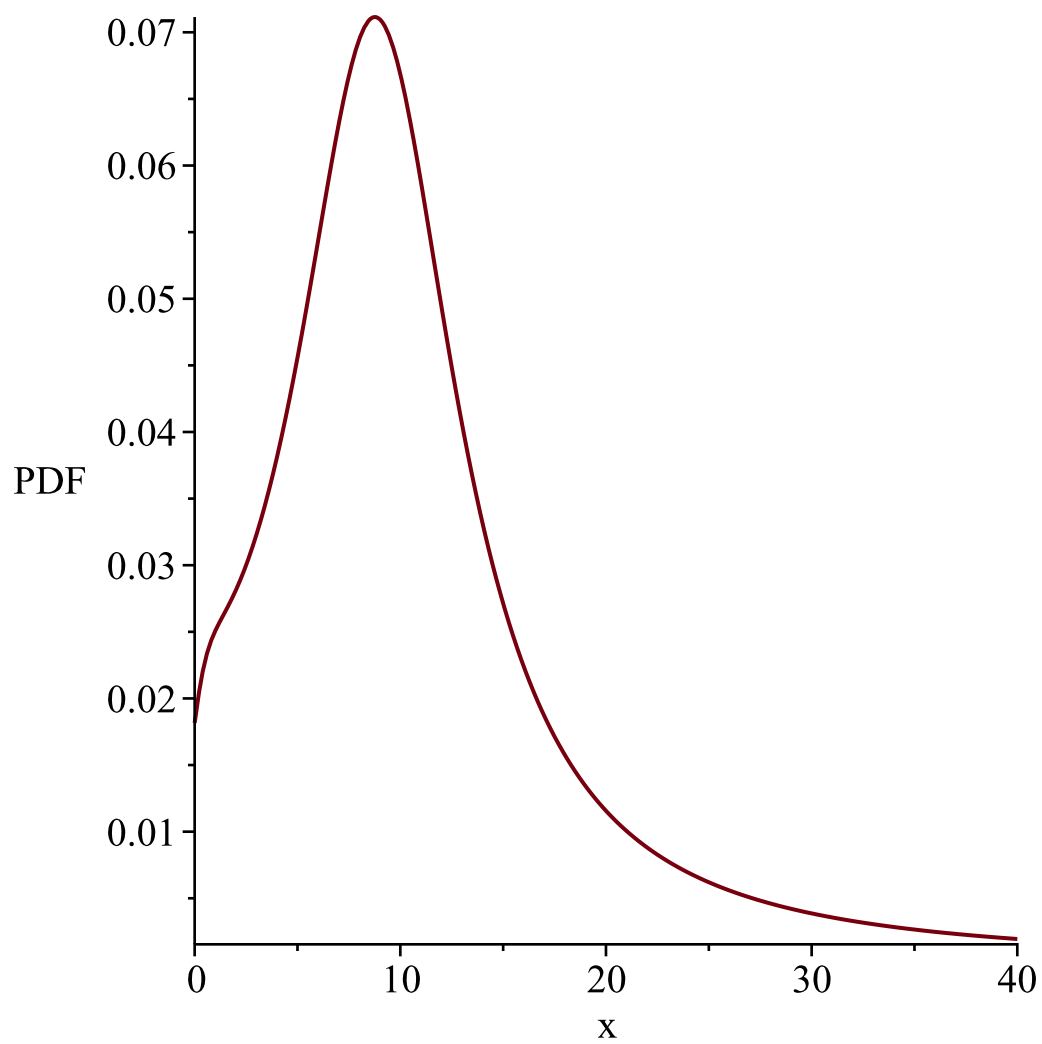
*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random
variable, 1
Resetting high to RV's maximum support value*

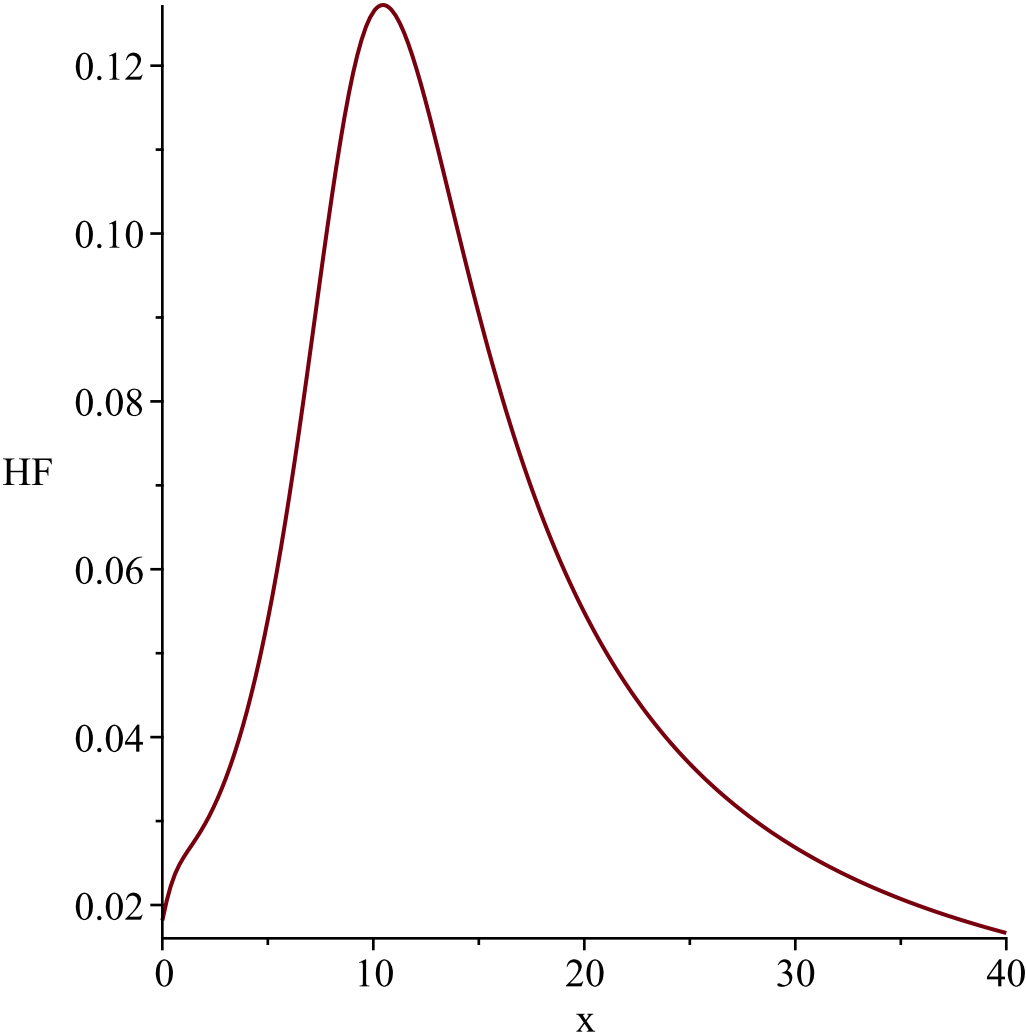


*WARNING(PlotDist): High value provided by user, 40
is greater than maximum support value of the random
variable, 1
Resetting high to RV's maximum support value*

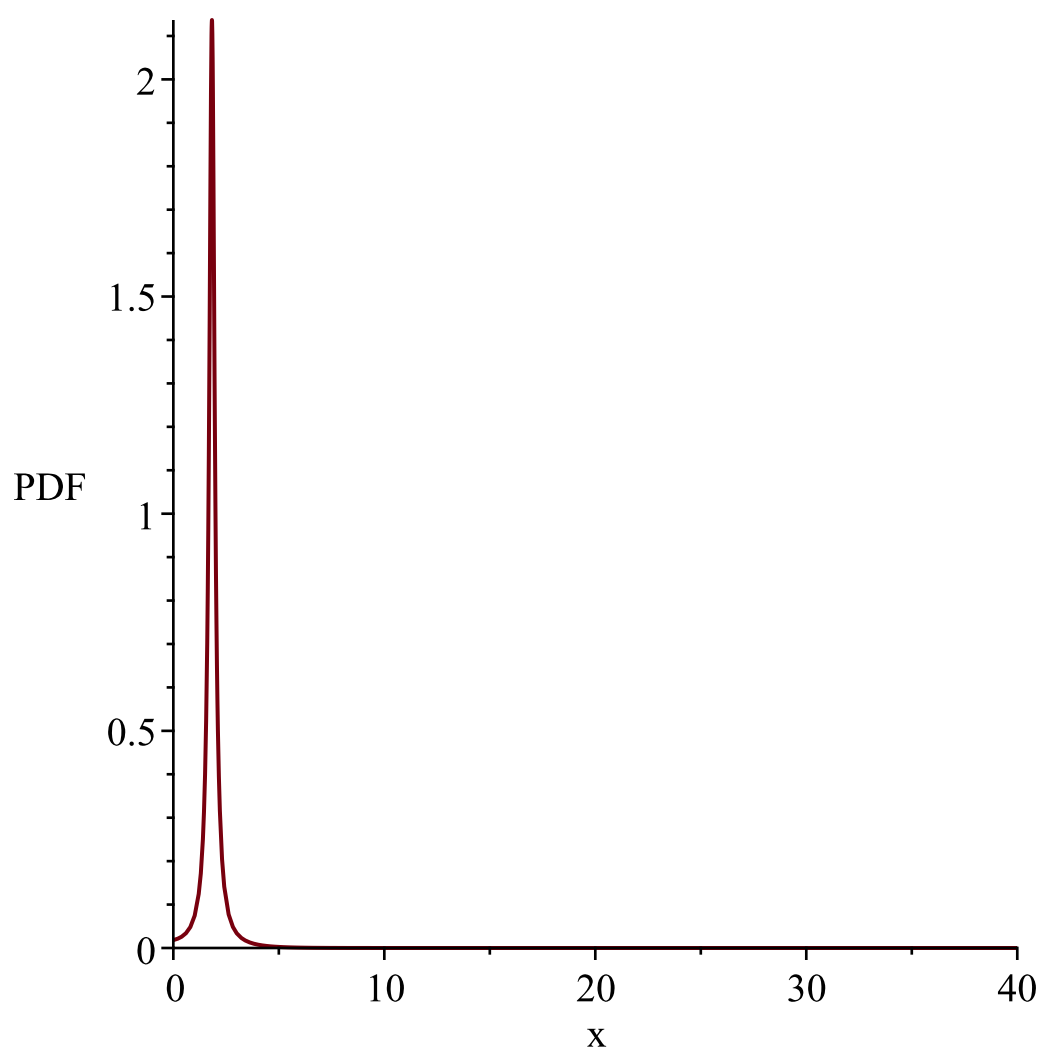


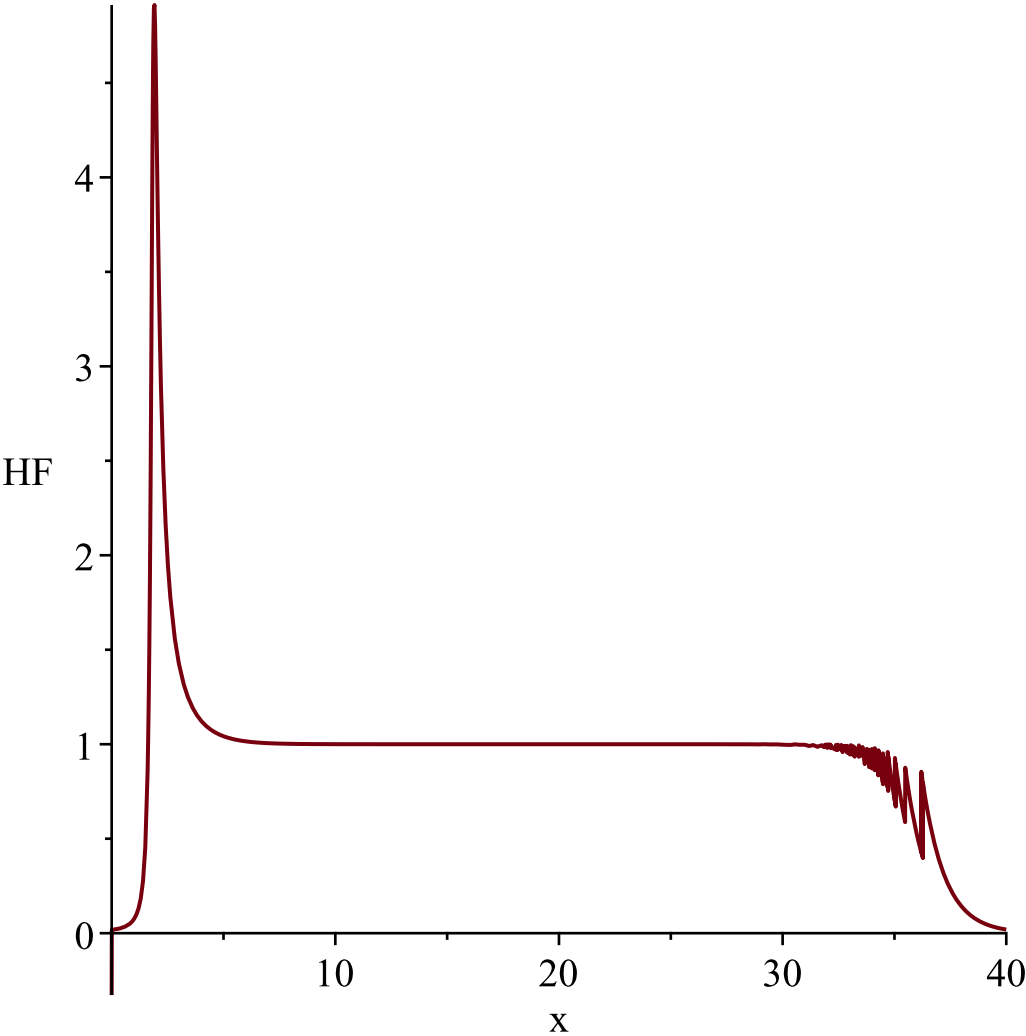
```
"i is", 12,  
" -----"  
-----"  
  
g := t→sinh(t)  
l := 0  
u := ∞  
  
Temp := ⌈⌈y~→  
4  
( 2 arctan(6) + π) ( 4 arcsinh(y~)2 - 24 arcsinh(y~) + 37) √y~2 + 1 ⌋, [0,  
∞ ], [ "Continuous", "PDF" ] ⌋
```





```
"i is", 13,  
" -----"  
-----"  
  
g := t→arcsinh(t)  
l := 0  
u := ∞  
Temp := ⌊⌊ y~→ -  $\frac{4 \cosh(y\sim)}{(2 \arctan(6) + \pi) (-4 \cosh(y\sim)^2 + 24 \sinh(y\sim) - 33)}$  ⌋, [0, ∞],  
["Continuous", "PDF"] ⌋
```





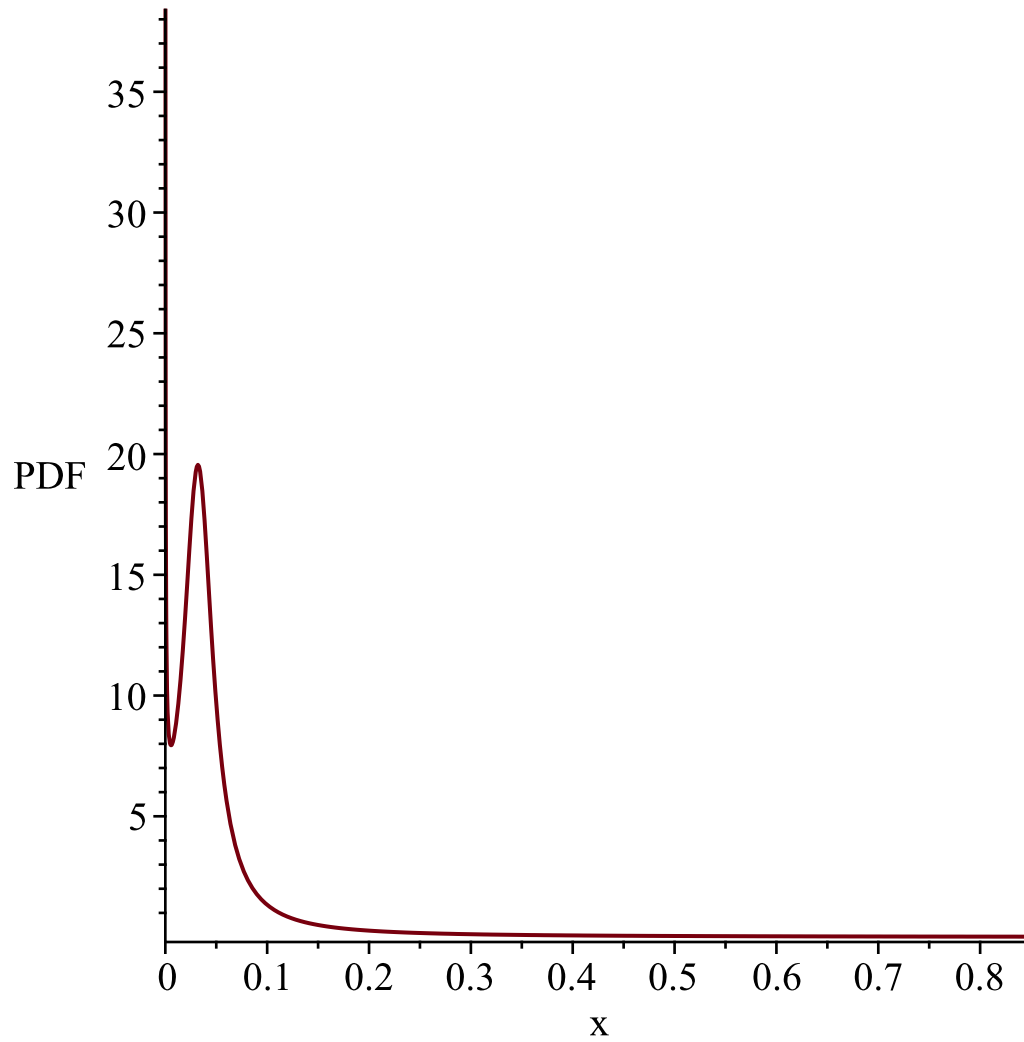
"i is", 14,
"-----"
"-----"

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

$$Temp:=\left[\left[y\sim\right.\right.\\ \left.\rightarrow\frac{4}{\sqrt{y\sim^2+1}\left(2\arctan(6)+\pi\right)\left(4\operatorname{arccsch}(y\sim)^2-32\operatorname{arccsch}(y\sim)+65\right)\lfloor y\sim\rfloor}\right],\left[0,\right.\\ \left.\frac{2}{e-e^{-1}}\right],\left["Continuous", "PDF"\right]\Big]$$

*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