```
> 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 >= 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)";
```

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

$$bfname := \text{"InvertedGammaRV(2,3)"} \quad \textbf{(1)}$$

```
> #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);
```

$$-\ln(y) \quad \textbf{(2)}$$

```
> # 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 19 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;
```

$$filename := \text{"C:/LatexOutput/Trash.tex"}$$

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

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

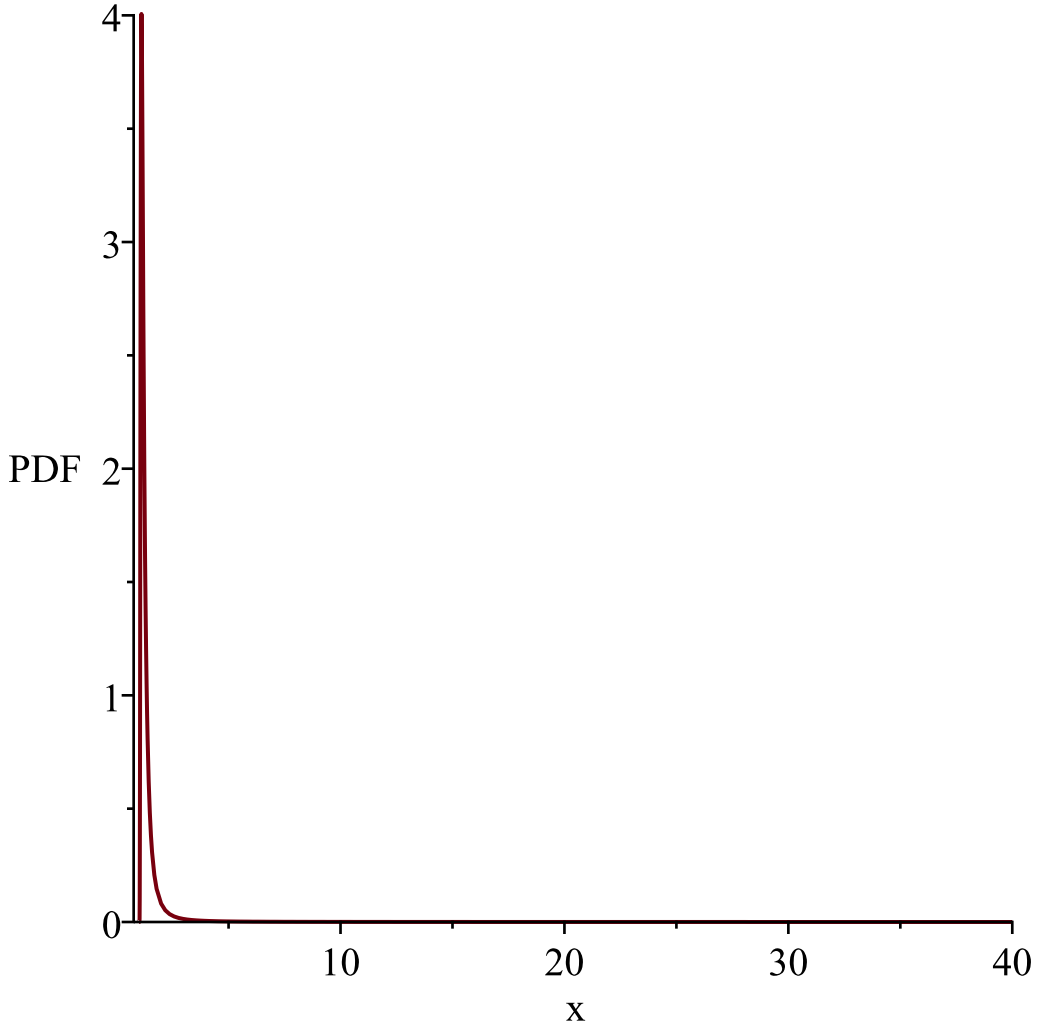
$$g := t \to \frac{1}{\operatorname{csch}(t)} + 1$$

$$l := 0$$

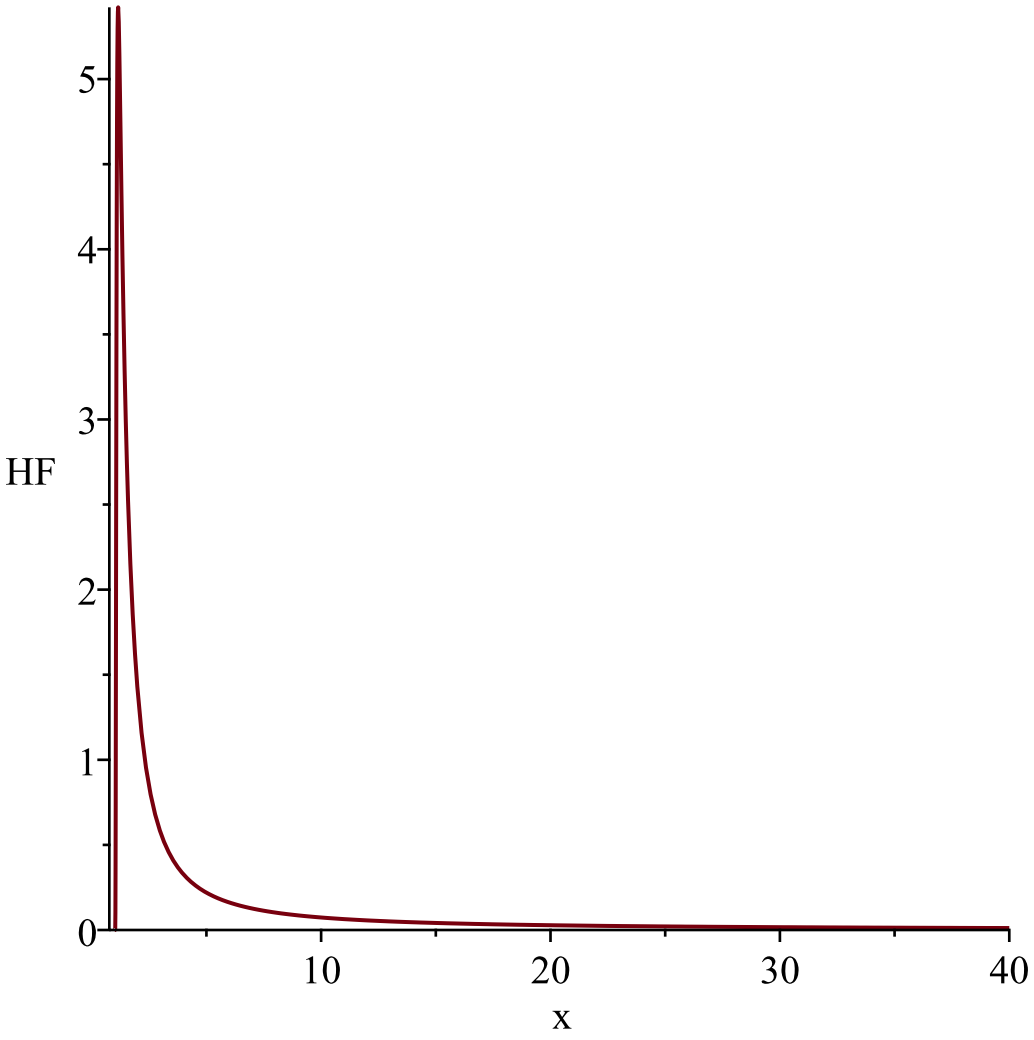
$$u := \infty$$

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

*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", 20,

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

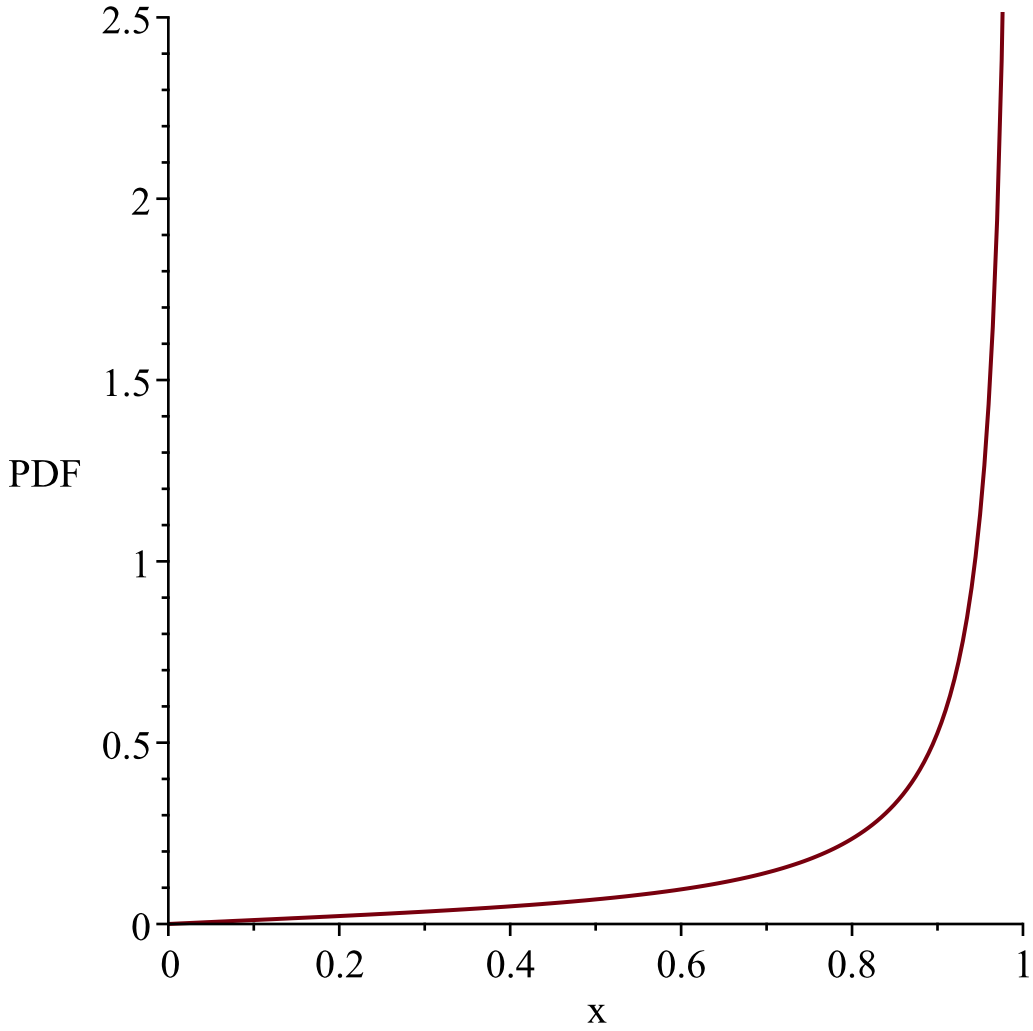
$$g := t \to \tanh\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

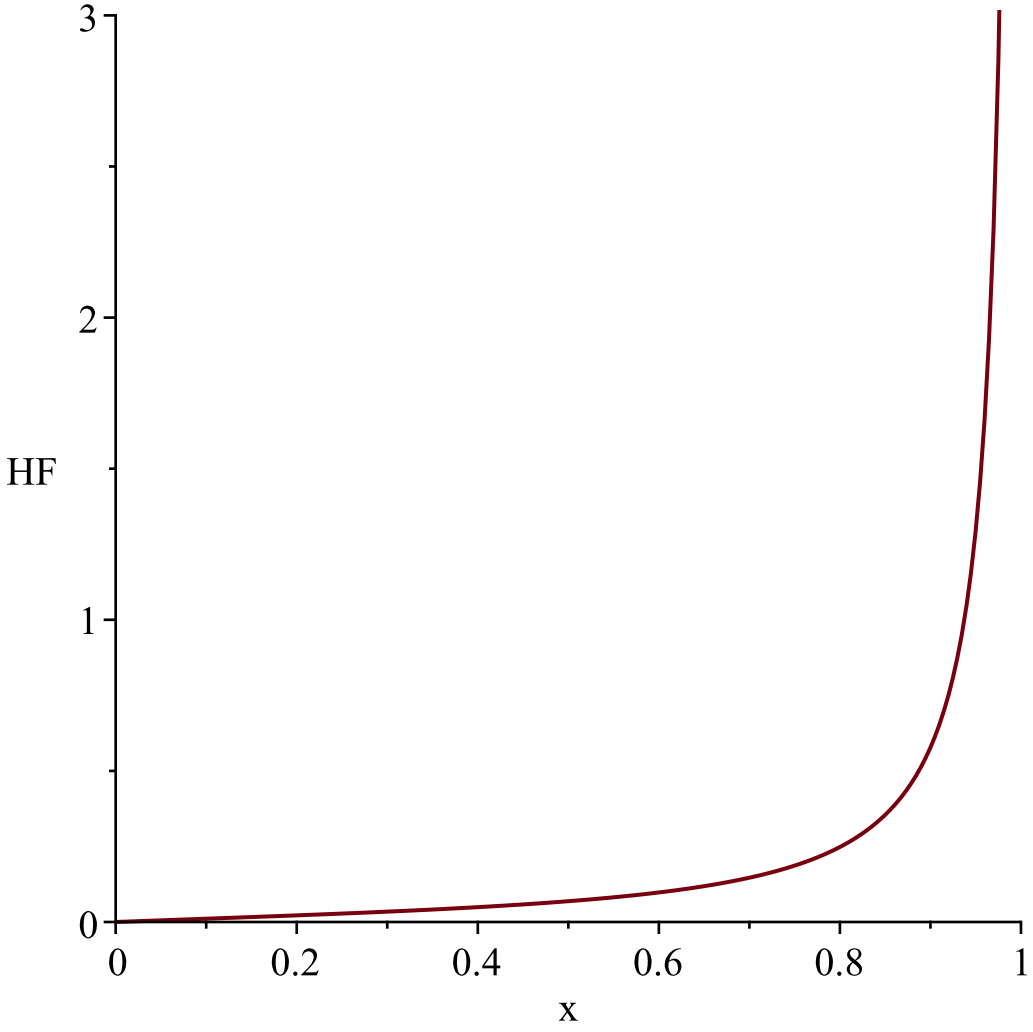
$$Temp := \left[\left[y\sim \to -\frac{1}{9}\ \frac{\operatorname{arctanh}(y\sim)}{\left(\frac{y\sim+1}{\sqrt{-y\sim^2+1}}\right)^{1/3}\left(y\sim^2-1\right)}\right], [0, 1], ["\text{Continuous}", "\text{PDF}"]\right]$$

*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", 21,

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

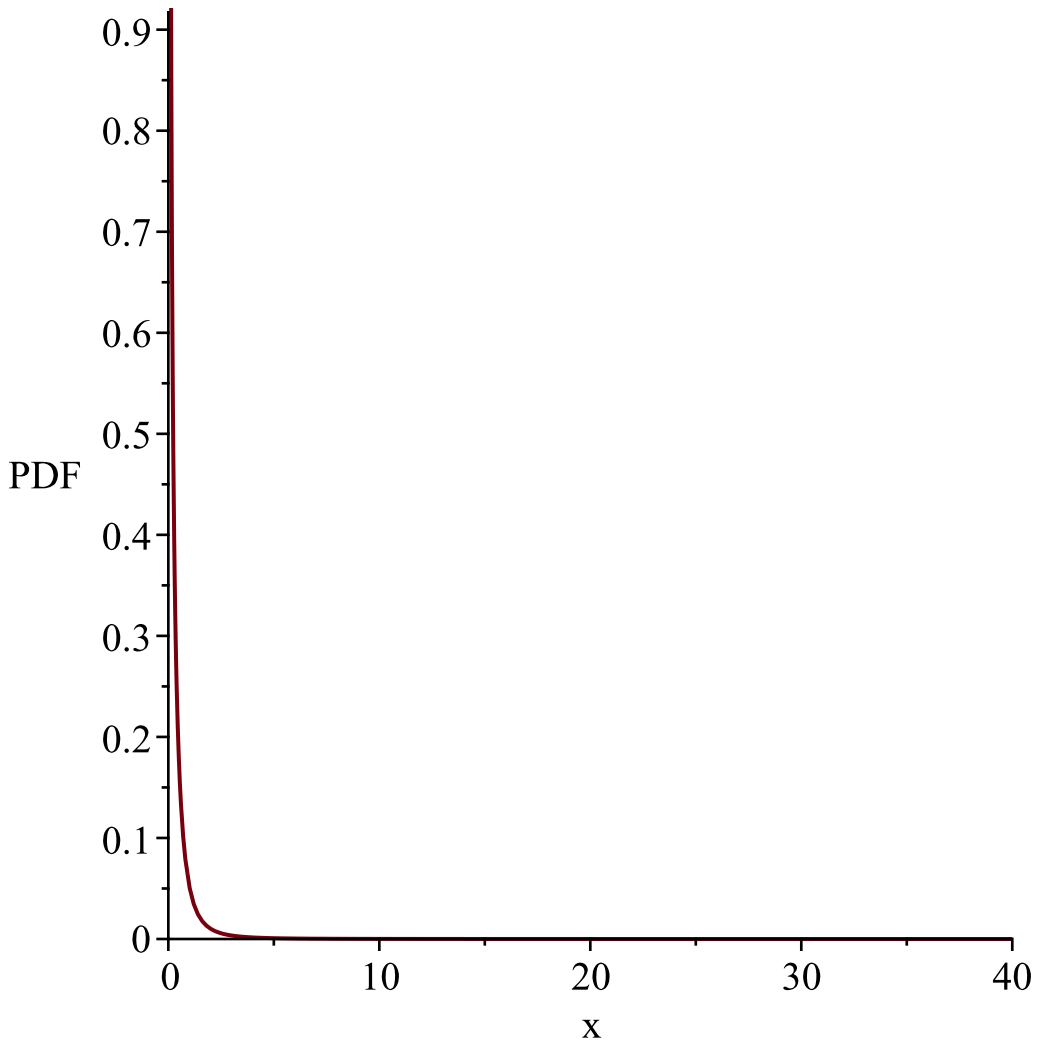
$$g := t \to \operatorname{csch}\left(\frac{1}{t}\right)$$

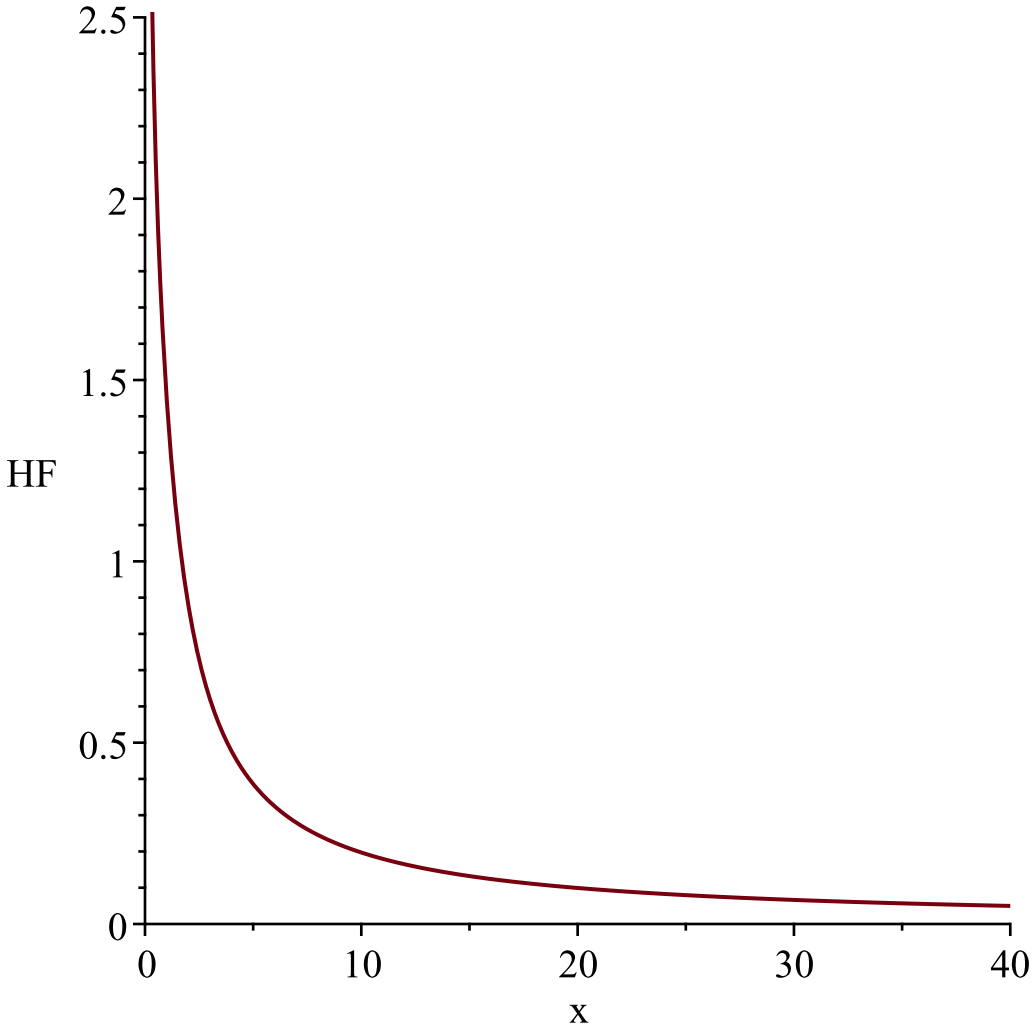
$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{9}\ \frac{\operatorname{arccsch}(y\sim)}{\left(\frac{\operatorname{signum}(y\sim)\sqrt{y\sim^2+1}+1}{y\sim}\right)^{1/3}\sqrt{y\sim^2+1}\ |y\sim|}\right], [0, \infty],\right.$$

$$\left.["Continuous", "PDF"]\right]$$


0.9
0.8
0.7
0.6
0.5
PDF
0.4
0.3
0.2
0.1
0
0
10
20
30
40
x




"i is", 22,

" ----------

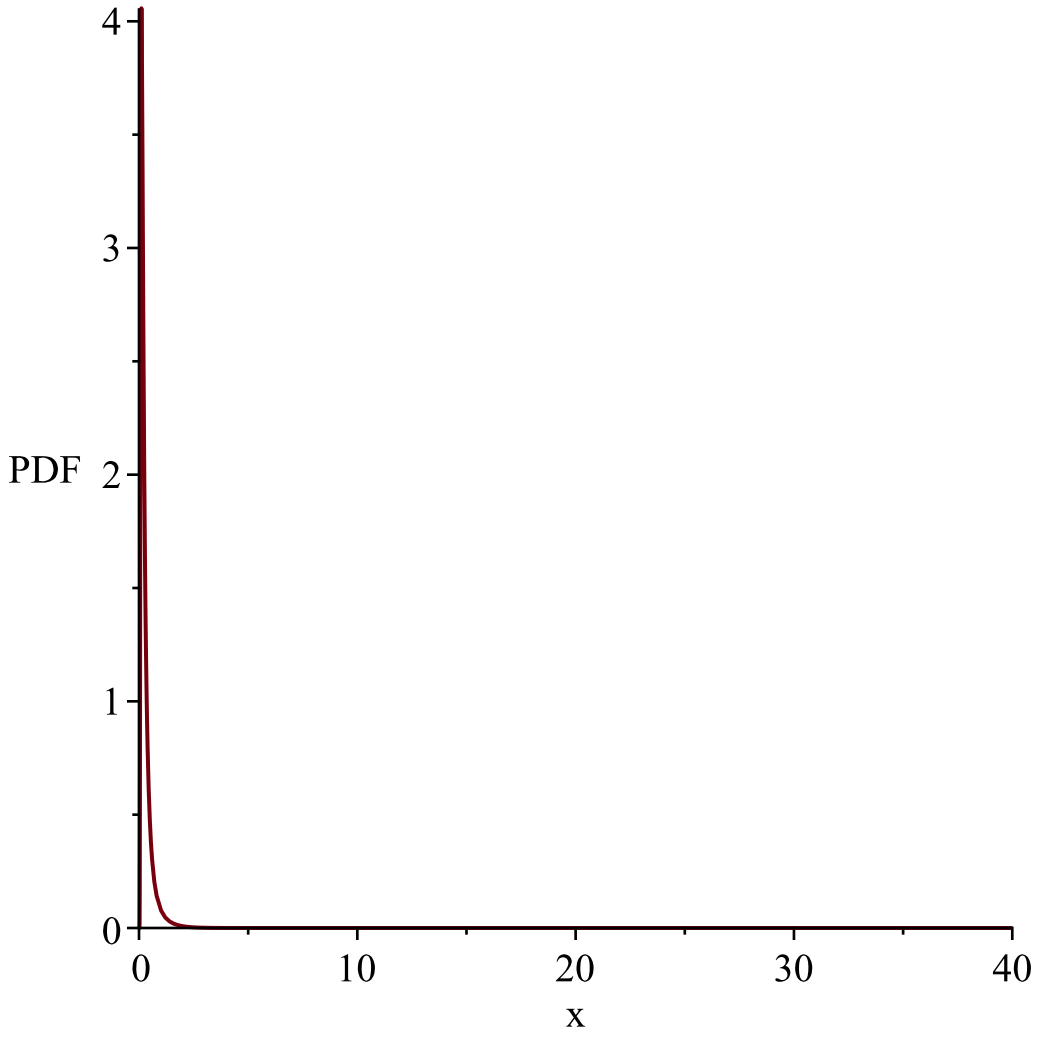
---------- "

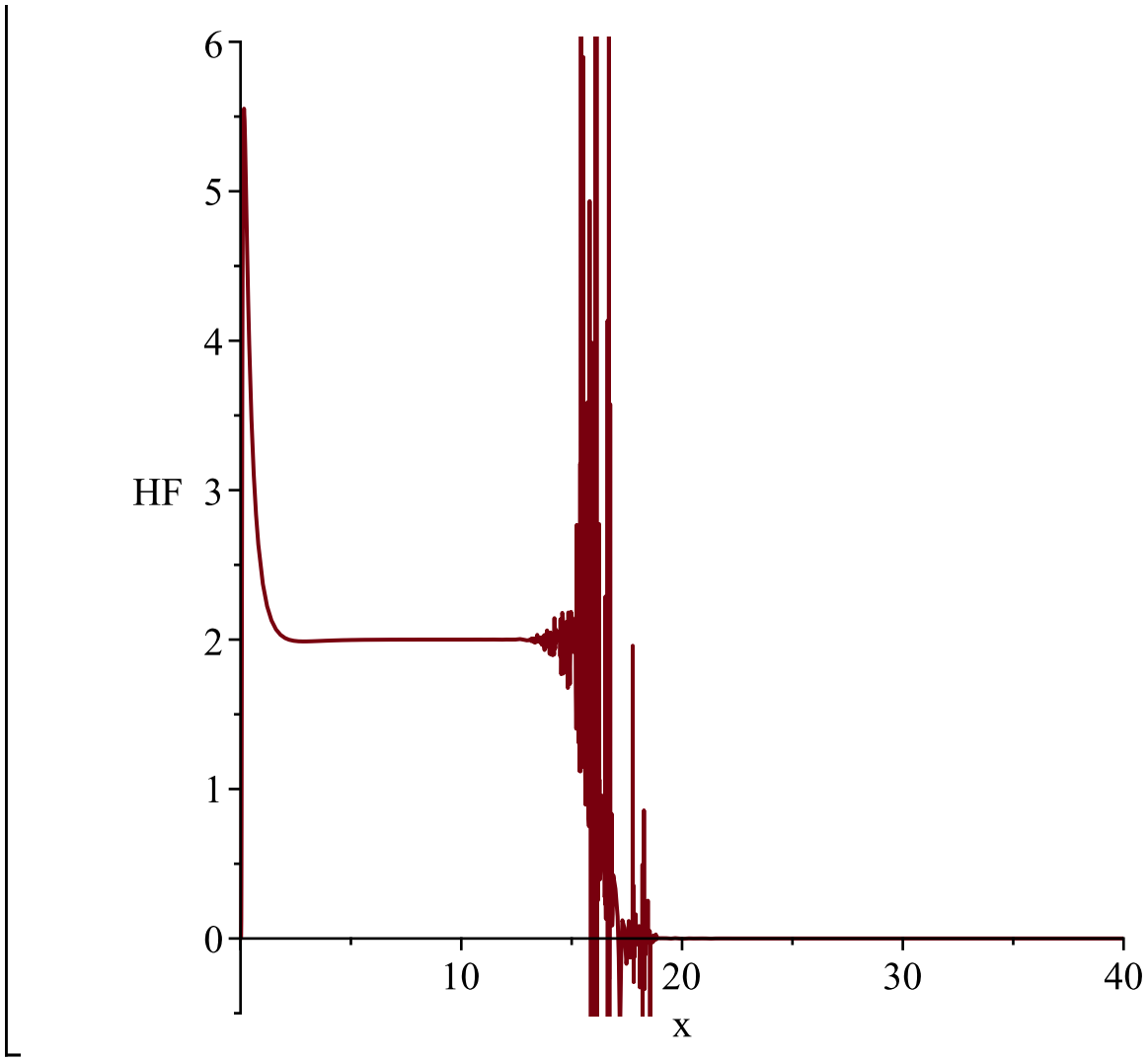
$$g := t \to \operatorname{arccsch}\left(\frac{1}{t}\right)$$

$$l := 0$$

$$u := \infty$$

$$Temp := \left[\left[y\sim \to \frac{1}{9}\ \frac{e^{-\frac{1}{3\sinh(y\sim)}}\cosh(y\sim)}{\sinh(y\sim)^3}\right], [0, \infty], ["\text{Continuous}", "\text{PDF}"]\right]$$


4
3
PDF
2
1
0
0
10
20
30
40
x


6
5
4
HF 3
2
1
0
10
20
30
40
x