Ratio−Of−Uniforms Methode

AKVFM Numerische Methoden der Finanz− und Versicherungsmathematik

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Ratio of uniforms, allgemeine Definition

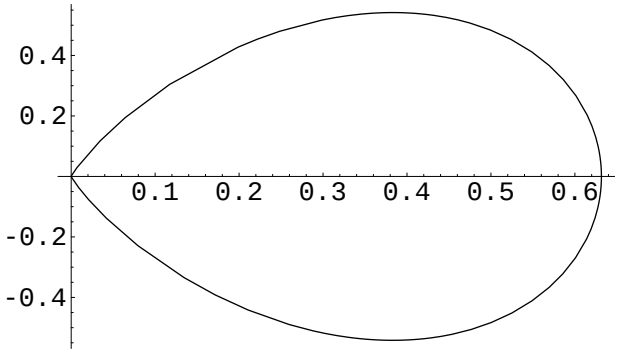
```
In[4]:= << Graphics`
```

Definition des Bereichs A:

```
In[6]:= matches[{x_, y_}, f_] := (0.0001 < x && x ≤ Sqrt[f[y/x]]);
        bnd[x_, f_] := {Sqrt[f[x]], x Sqrt[f[x]]}
```

ROU fuer Normalverteilung

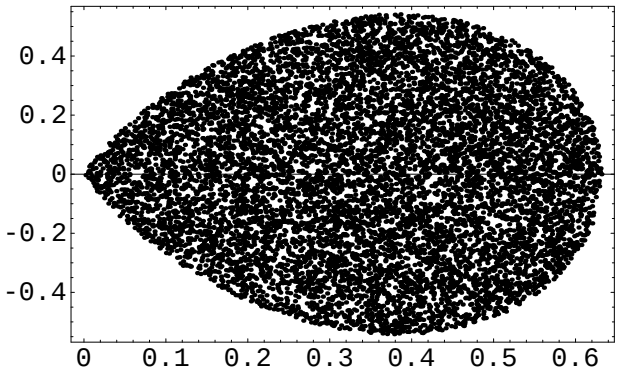
```
In[97]:= fNV01[x_] := 1/Sqrt[2 π] Exp[-x^2/2]
         ParametricPlot[bnd[x, fNV01], {x, -10, 10}];
```



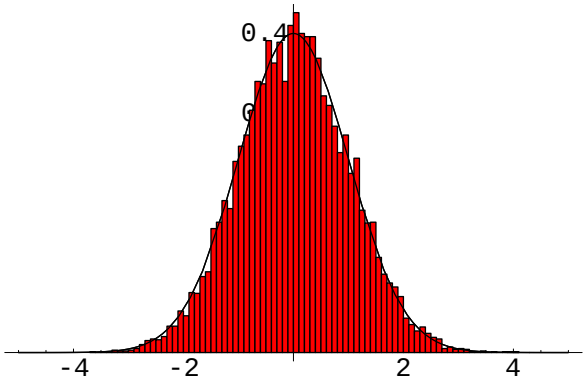
Mit 10000 Zufallszahlen:

```
selectedMC = {}; normalNrsMC = {};
While[Length[selectedMC] < 10000,
 {u, v} = {0.7 Random[], 1.2 Random[] - 0.6};
 If[matches[{u, v}, fNV01],
  AppendTo[selectedMC, {u, v}]; AppendTo[normalNrsMC, v / u]];
]
```

```
In[83]:= ListPlot[selectedMC, Frame → True];
```



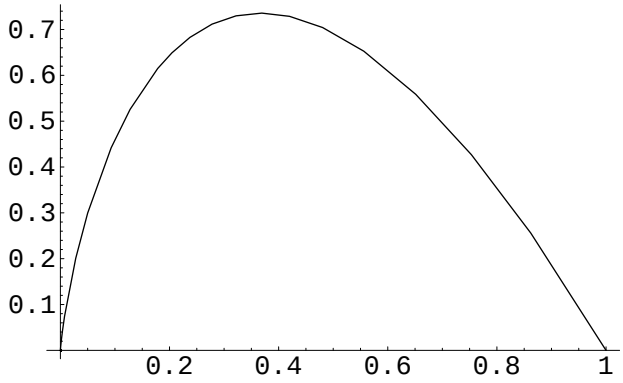

```
In[87]:= hist = Histogram[normalNrsMC, HistogramScale → 1, DisplayFunction → Identity];
         densplot = Plot[fNV01[x], {x, -5, 5}, DisplayFunction → Identity];
         Show[{densplot, hist, densplot}, DisplayFunction → $DisplayFunction];
```



ROU fuer Exponentialverteilung

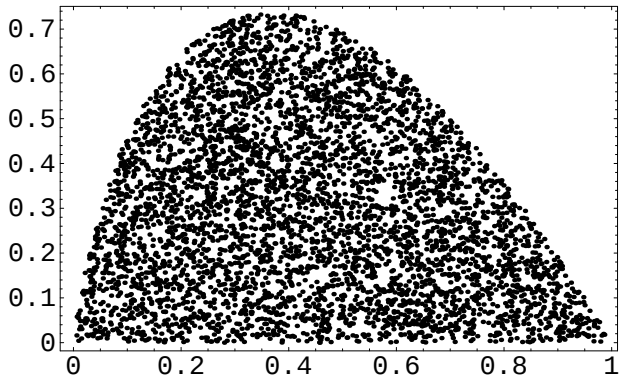
In[29]:=
```
fExp[x_] := Exp[-x]
```

In[60]:=
```
ParametricPlot[bnd[x, fExp], {x, 0, 5000}, PlotPoints → 500];
```

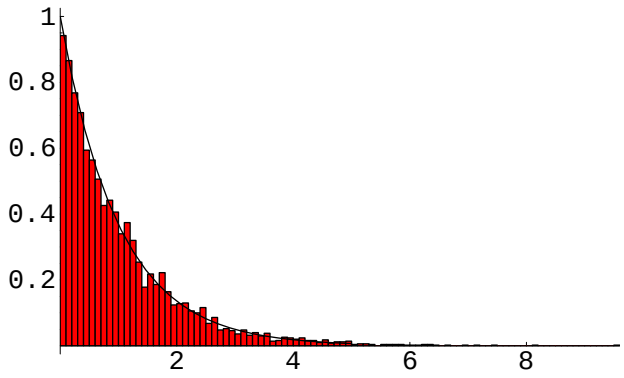



```
selectedMC = {}; nrsMC = {};
While[Length[selectedMC] < 5000,
 {u, v} = { Random[], (2 / E) Random[]};
 If[matches[{u, v}, fExp], AppendTo[selectedMC, {u, v}]; AppendTo[nrsMC, v / u]];
]
```

In[67]:=
```
ListPlot[selectedMC, Frame → True];
```



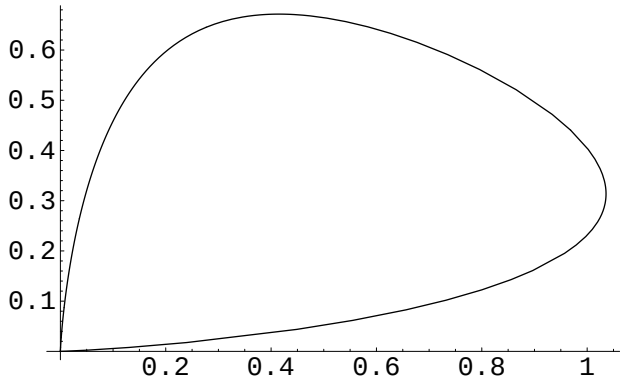
In[68]:=
```
hist = Histogram[nrsMC, HistogramScale → 1,
   PlotRange → {{0, 5}, {0, 1}} , DisplayFunction → Identity];
densplot = Plot[fExp[x], {x, 0, 5}, DisplayFunction → Identity];
Show[{hist, densplot}, DisplayFunction → $DisplayFunction];
```



ROU fuer IG

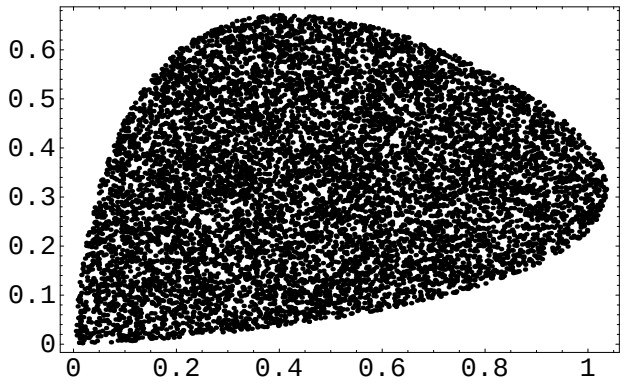
In[51]:=
```
fIG[x_] := δ Exp[δ γ]/Sqrt[2 π] x^(-3/2) Exp[-1/2 (δ^2 1/x + γ^2 x)];
```

In[96]:=
```
ParametricPlot[bnd[x, fIG], {x, 0, 50}, PlotPoints → 500, PlotRange → All];
```




```
δ = 1; γ = 1;
selectedMC = {}; nrsMC = {};
While[Length[selectedMC] < 10000,
 {u, v} = { 1.2 Random[], 0.8 (Random[])};
 If[matches[{u, v}, fIG], AppendTo[selectedMC, {u, v}]; AppendTo[nrsMC, v / u]];
]
```

In[56]:=
```
ListPlot[selectedMC, Frame → True];
```



In[57]:=
```
hist = Histogram[nrsMC, HistogramScale → 1,
   PlotRange → {{0, 5}, {0, 1}} , DisplayFunction → Identity];
densplot = Plot[fIG[x], {x, 0, 5}, DisplayFunction → Identity];
Show[{hist, densplot}, DisplayFunction → $DisplayFunction];
```