一様乱数（メルセンヌツイスタ）

In[77]:=
```
SetDirectory[
  "/Users/takasu/home/情報科学科の仕事/講義/平成２６年度/H26 大学院講義/Generating
    random numbers/rvs/DerivedData/rvs/Build/Products/Debug/"]
```

Out[77]=
```
/Users/takasu/home/情報科学科の仕事/講義/平成２６年度/H26
  大学院講義/Generating random numbers/rvs/DerivedData/rvs/Build/Products/Debug
```

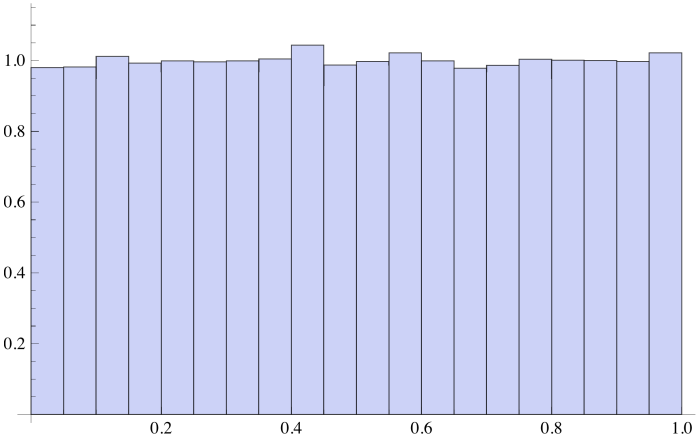
In[78]:=
```
data = ReadList["uniform.out", Real];
len = Length[data]
maxdata = Max[data]
```

Out[79]=
```
100 000
```

Out[80]=
```
0.999972
```

In[81]:=
```
Histogram[data, {0, 1, 0.05}, "PDF"]
```

Out[81]=



In[82]:=
```
mean = Apply[Plus, data] / len
```

Out[82]=
```
0.500874
```

In[83]:=
```
Apply[Plus, (data - mean)^2] / len
```

Out[83]=
```
0.0831453
```

一様乱数 (*Mathematica*)

In[84]:=
```
Random[]
```

Out[84]=
```
0.616362
```

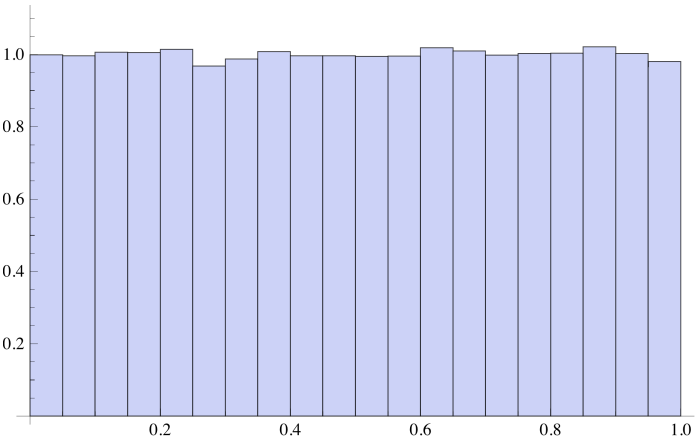
In[85]:=
```
Table[Random[], {10}]
```

Out[85]=
```
{0.340182, 0.486816, 0.347294, 0.63905, 0.271129,
 0.93767, 0.730877, 0.000725689, 0.535239, 0.407441}
```

In[86]:=
```
data = Table[Random[], {100 000}];
```

In[87]:=
```
Histogram[data, {0, 1, 0.05}, "PDF"]
```

Out[87]=



In[88]:=
```
Random[Real, {1, 3}]
```

Out[88]=
```
2.37868
```

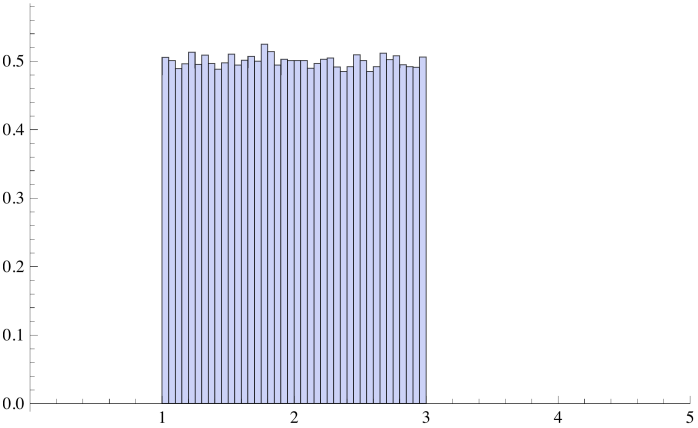
In[89]:=
```
Table[Random[Real, {1, 3}], {10}]
```

Out[89]=
```
{2.37721, 2.12515, 2.78299, 2.32511,
 1.75352, 2.24504, 2.31317, 1.48853, 1.92003, 1.29328}
```

In[90]:=
```
data = Table[Random[Real, {1, 3}], {100 000}];
```

In[91]:=
```
Histogram[data, 50, "PDF", PlotRange → {{0, 5}, All}, AxesOrigin → {0, 0}]
```

Out[91]=



指数乱数 （メルセンヌツイスタ）

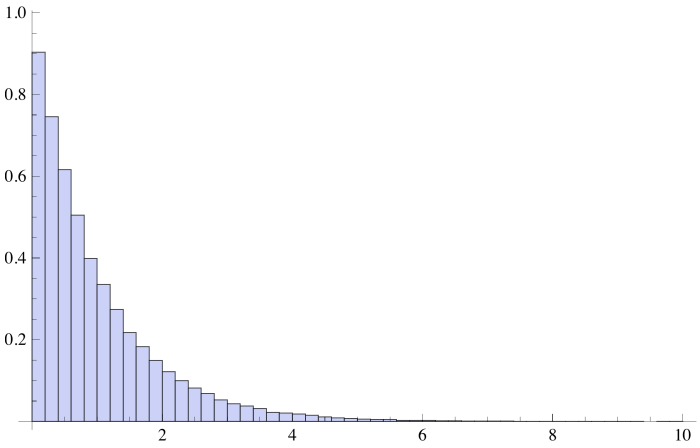
In[92]:=
```
data = ReadList["exp.out", Real];
len = Length[data]
maxdata = Max[data]
```

Out[93]=
```
100 000
```

Out[94]=
```
9.84422
```

In[95]:=
```
Histogram[data, 50, "PDF"]
```

Out[95]=



In[96]:=
```
mean = Apply[Plus, data] / len
```

Out[96]= 0.996328

In[97]:=
```
Apply[Plus, (data - mean) ^ 2] / len
```

Out[97]= 0.992622

指数乱数 (*Mathematica*)

In[98]:=
```
data = Table[Random[], {100 000}];
```

In[104]:=
```
data2 = -Log[data] / 0.5;
```

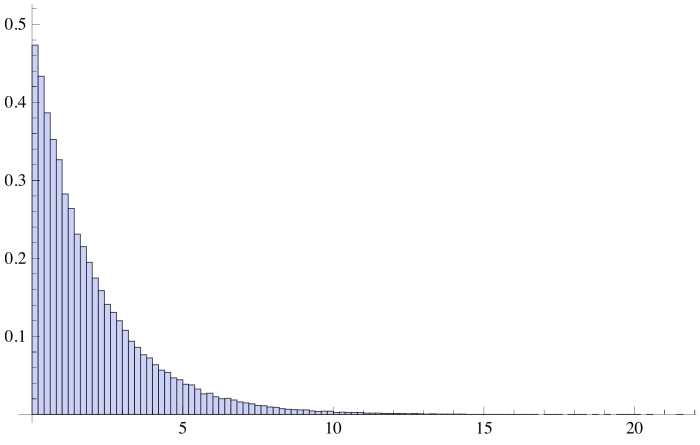
In[105]:=
```
Min[data2]
Max[data2]
```

Out[105]= 0.0000111478

Out[106]= 21.5001

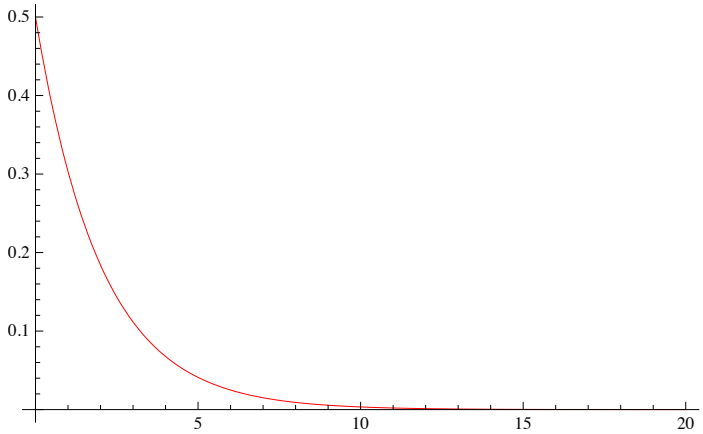
In[107]:=
```
ghist = Histogram[data2, 100, "PDF"]
```

Out[107]=



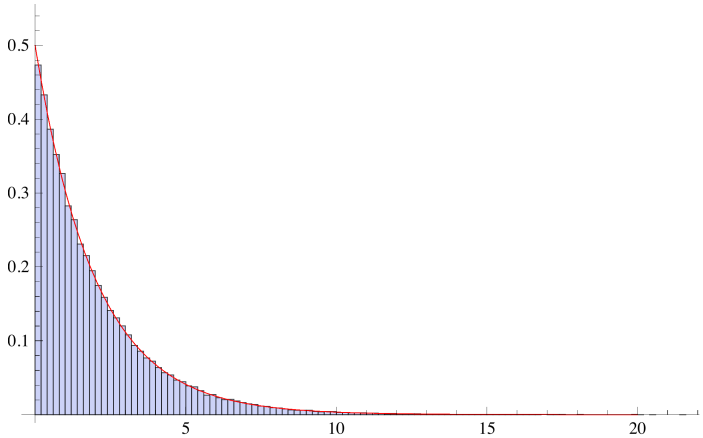
In[110]:=
```
g = Plot[gamma Exp[- gamma x] /. gamma → 0.5,
   {x, 0, 20}, PlotStyle → RGBColor[1, 0, 0], PlotRange → All]
```

Out[110]=



In[111]:=
```
Show[ghist, g]
```

Out[111]=



正規分布乱数 （メルセンヌツイスタ）

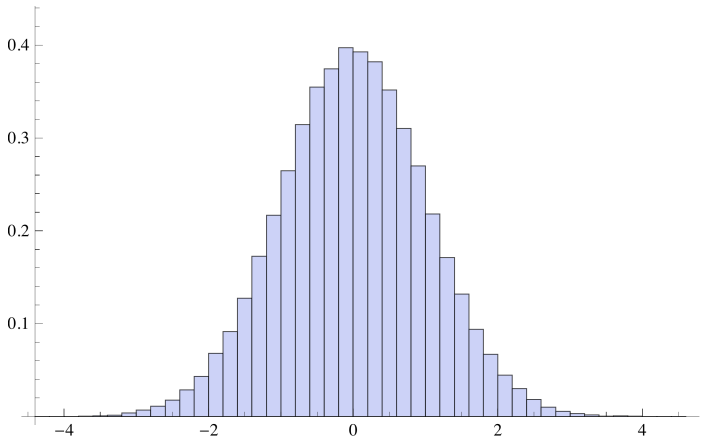
In[112]:=
```
data = ReadList["gauss.out", Real];
len = Length[data]
maxdata = Max[data]
```

Out[113]= 100 000

Out[114]= 4.58849

In[115]:=
```
Histogram[data, 50, "PDF"]
```

Out[115]=



In[116]:=
```
mean = Apply[Plus, data] / len
```

Out[116]=
```
0.00179643
```

In[117]:=
```
Apply[Plus, (data - mean) ^ 2] / len
```

Out[117]=
```
1.0035
```

正規分布乱数 (*Mathematica*)

In[118]:=
```
data = Table[Random[NormalDistribution[0, 1]], {100 000}];
```

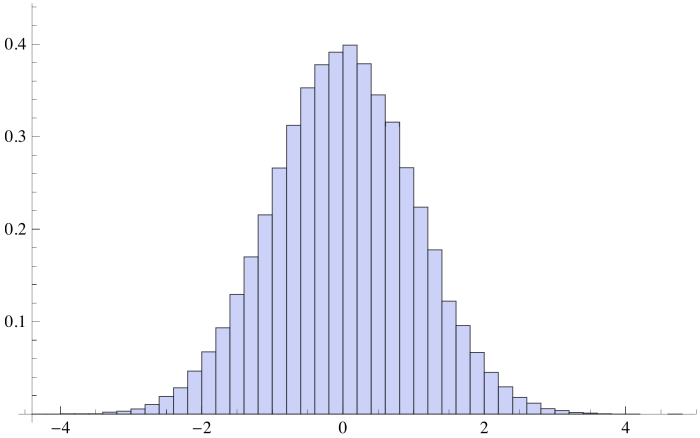
In[119]:=
```
Min[data]
Max[data]
```

Out[119]=
```
-4.33116
```

Out[120]=
```
4.65559
```

In[121]:=
```
ghist = Histogram[data, 50, "PDF"]
```

Out[121]=

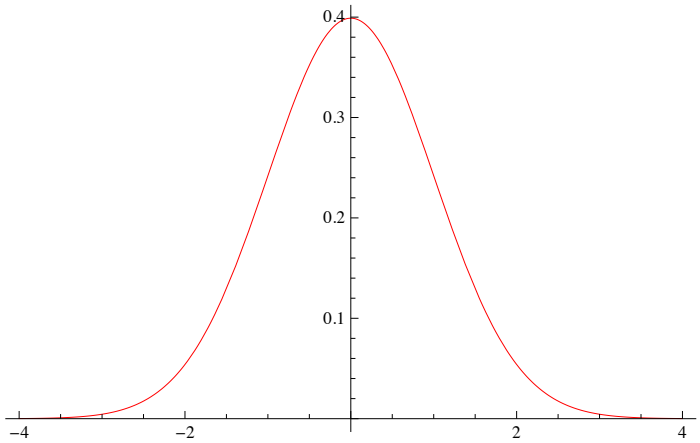


In[122]:=
```
gauss = Exp[-(x - m) ^ 2 / 2 / sd ^ 2] / Sqrt[2 Pi] / sd /. {m → 0, sd → 1}
g = Plot[gauss, {x, -4, 4}, PlotStyle → RGBColor[1, 0, 0], PlotRange → All]
```

Out[122]=

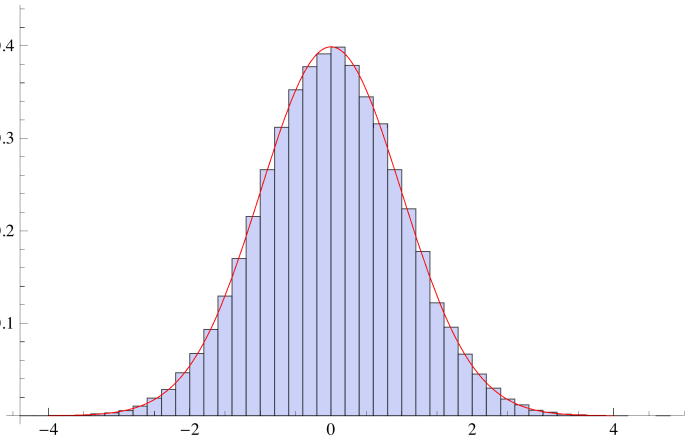
$$\frac{e^{-\frac{x^2}{2}}}{\sqrt{2\,\pi}}$$

Out[123]=



In[124]:=
```
Show[ghist, g]
```

Out[124]=



その他（確率変数の変数変換 by Mathematica）

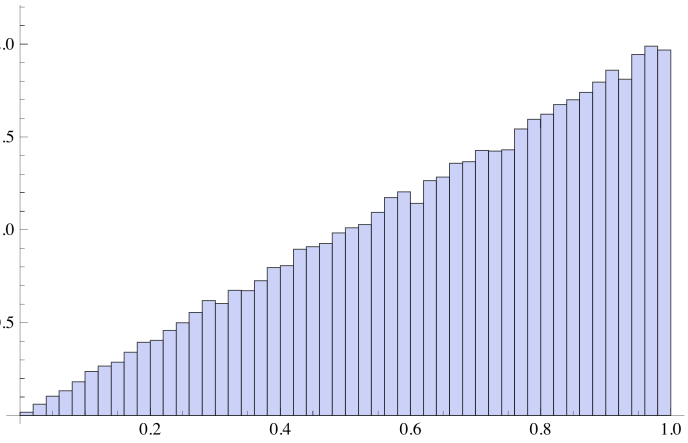
In[127]:=
```
data = Table[Random[], {100 000}];
```

In[128]:=
```
data2 = Sqrt[data];
```

In[129]:=
```
Min[data];
Max[data];
```

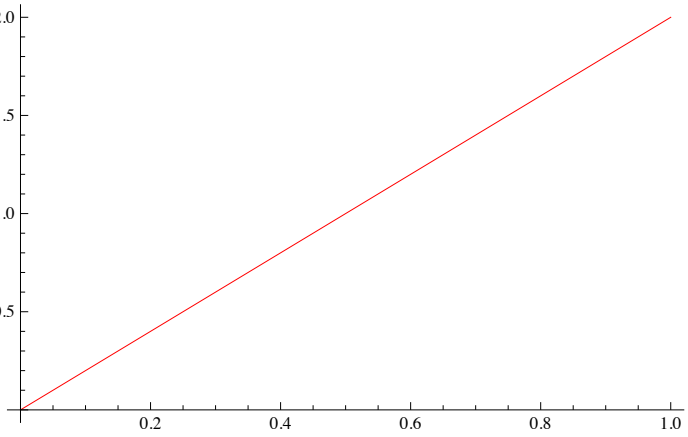
In[131]:=
```
ghist = Histogram[data2, 50, "PDF"]
```

Out[131]=



In[132]:=
```
g = Plot[2 x, {x, 0, 1}, PlotStyle → RGBColor[1, 0, 0], PlotRange → All]
```

Out[132]=



In[133]:=
```
Show[ghist, g]
```

Out[133]=