カイ２乗分布

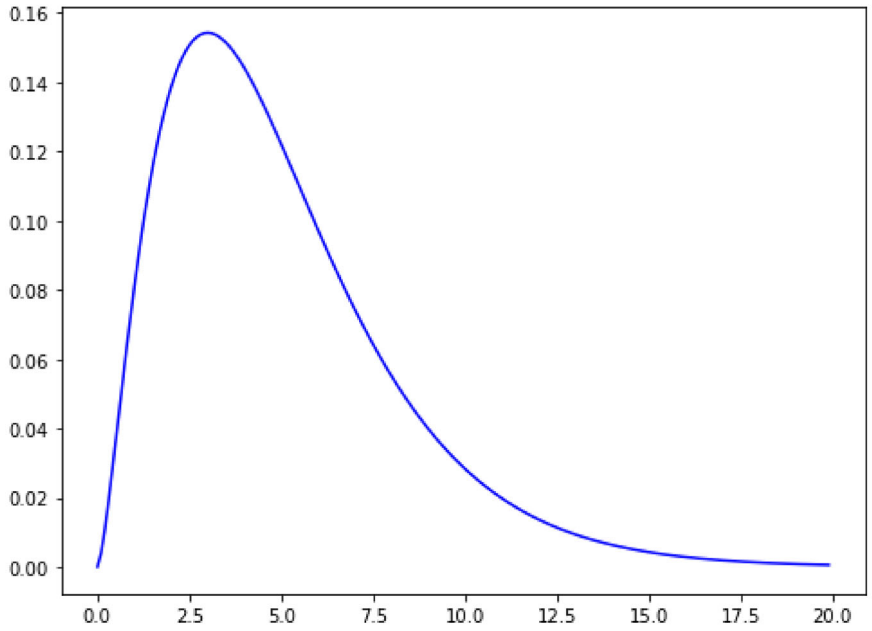
In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from scipy import stats
```

In [2]:
```
n=5                  # 自由度
rvChi=stats.chi2(n)  # 自由度 n の chi-square 分布
```

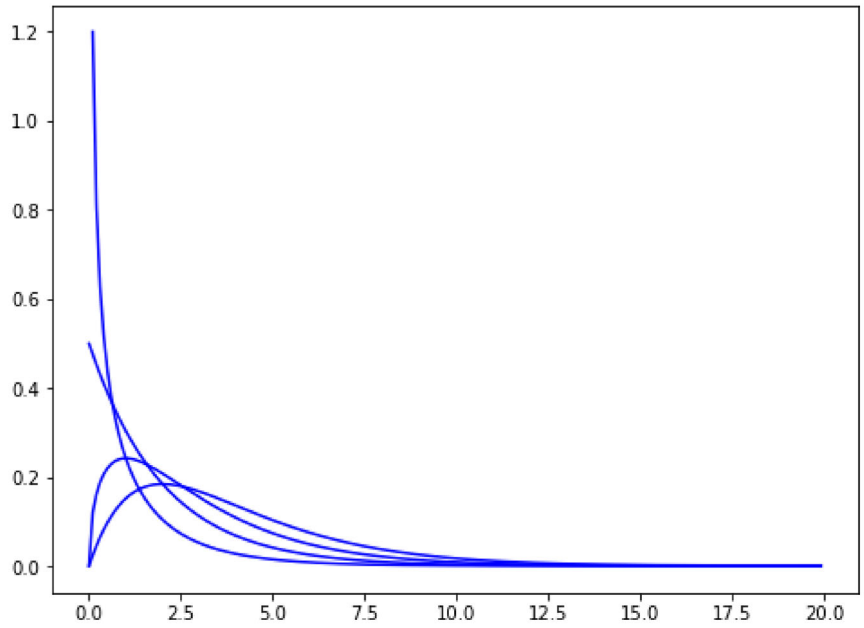
密度関数

In [3]:
```
#  密度関数の描画
fig = plt.figure(figsize=(8,6))
ax = fig.add_subplot(1,1,1)
xs=np.arange(0,20,0.1)
ax.plot(xs, rvChi.pdf(xs), color='blue')
```

Out[3]: [<matplotlib.lines.Line2D at 0x1e5fd84fd00>]



In [4]:
```
#  密度関数の描画 (n=1,2,3,4,5,...)
fig = plt.figure(figsize=(8,6))
ax = fig.add_subplot(1,1,1)
xs=np.arange(0,20,0.1)
for n in range(1,5):
    ax.plot(xs, stats.chi2(n).pdf(xs), color='blue')
```

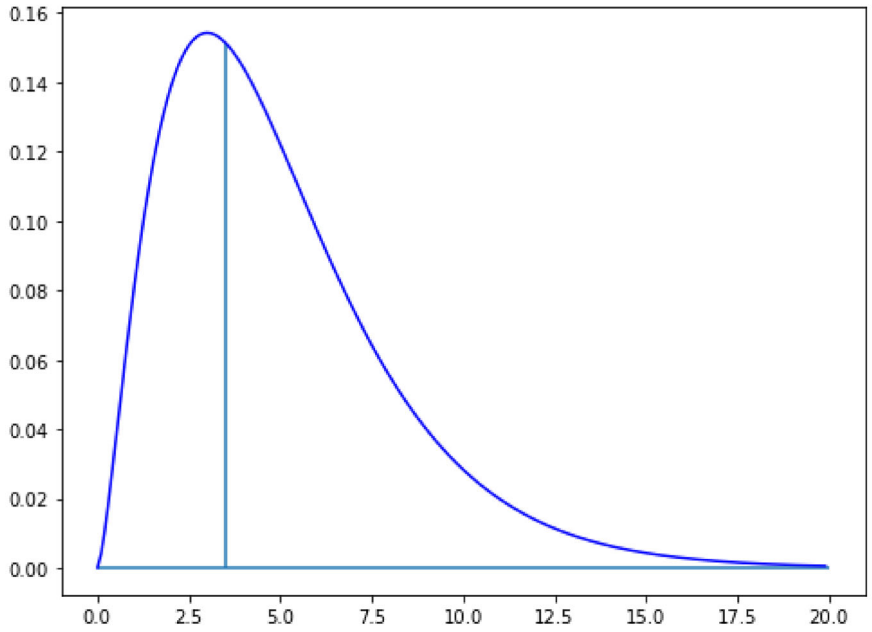


In [5]:
```
#  分布関数 (確率計算 P(T<= xx)=rvT.cdf(xx)
n = 5       # 自由度
x = 3.5
stats.chi2(n).cdf(x)
```

Out[5]:
```
0.3766123722504178
```

In [6]:
```
plt.figure(figsize=(8,6))
plt.plot(xs, rvChi.pdf(xs), color='blue')
plt.vlines(x, 0, rvChi.pdf(x))
plt.hlines(0, 0, 20)
```

Out[6]: <matplotlib.collections.LineCollection at 0x1e5febe8370>



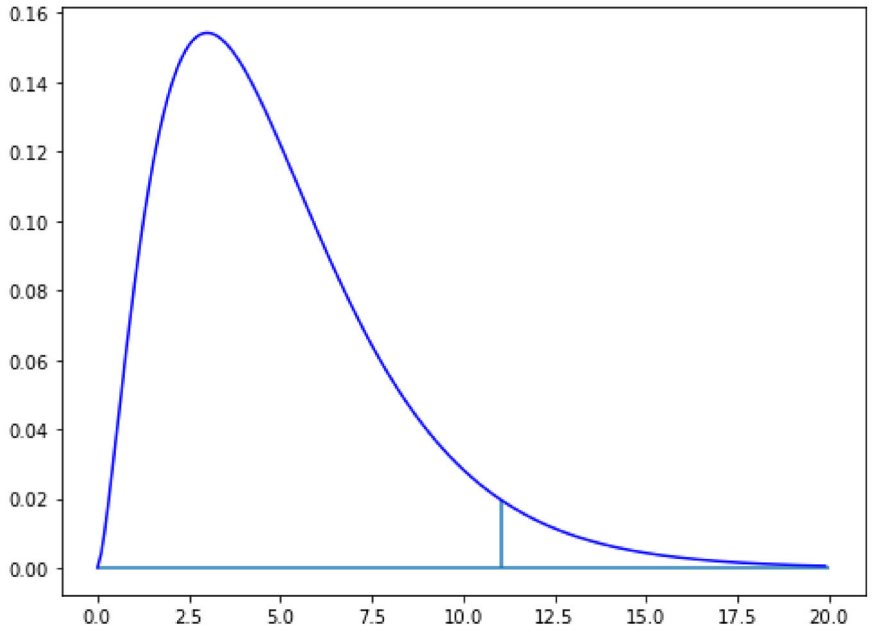
上側α点

In [7]:
```
#  上側 alpha 点
n = 5
alpha = 0.05
u_alpha=stats.chi2(n).isf(alpha)
u_alpha
```

Out[7]: 11.070497693516355

In [8]:
```
plt.figure(figsize=(8,6))
plt.plot(xs, rvChi.pdf(xs), color='blue')
plt.vlines(u_alpha, 0, rvChi.pdf(u_alpha))
plt.hlines(0, 0, 20)
```

Out[8]: <matplotlib.collections.LineCollection at 0x1e5fec5a520>



In [ ]: