

# Alles ist Normalverteilung

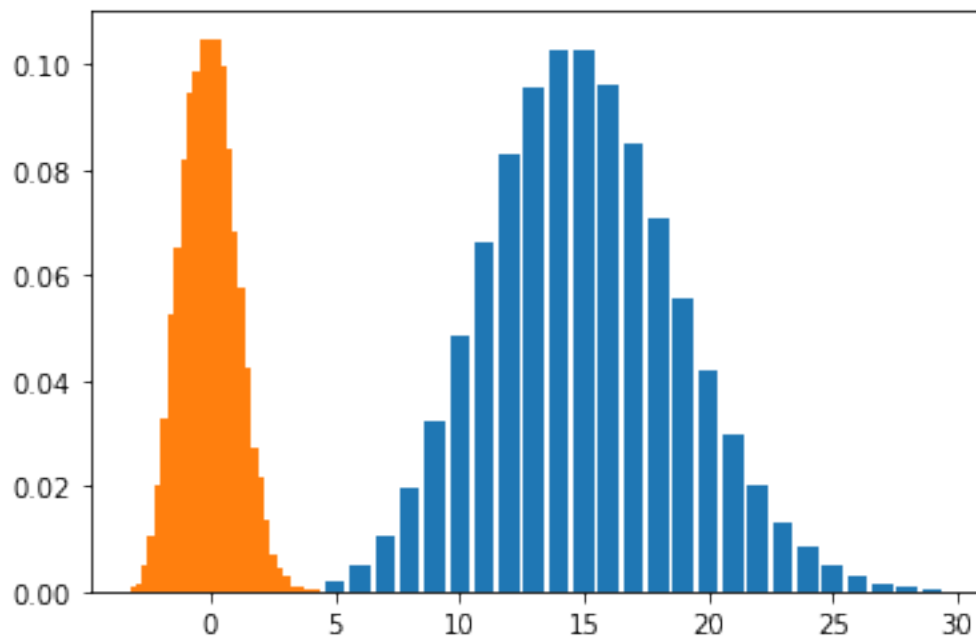
December 8, 2020

```
[1]: from numpy import sqrt, sum, histogram
    from matplotlib.pyplot import bar

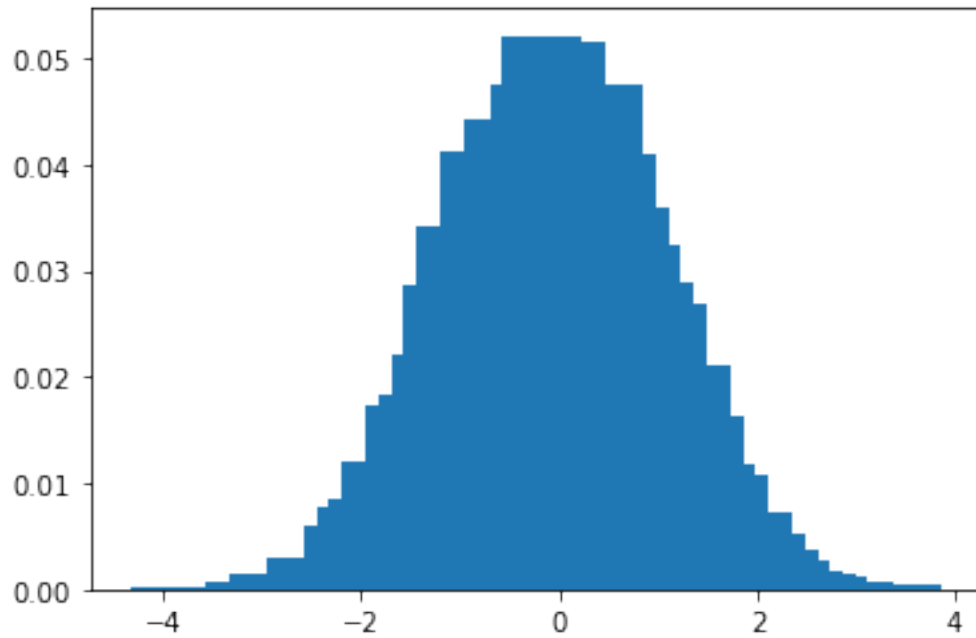
    def CLT (dist, n, repeat):
        R = (dist.rvs((n, repeat)) - dist.expect()) / (sqrt(n) * dist.std())
        hist, bins = histogram(sum(R, axis=0), bins="auto")
        bar(bins[:-1], hist / sum(hist))

[2]: from scipy.stats import poisson, binom, expon

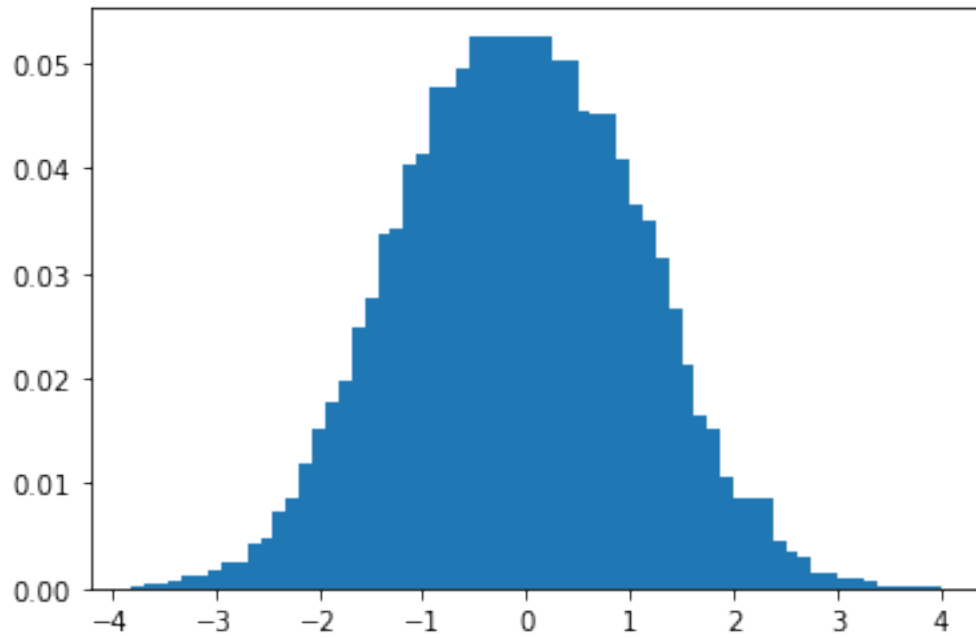
[3]: poi = poisson(15)
    L = list(range(30))
    bar(L, [poi.pmf(k) for k in L])
    CLT(poi, 1, 10000)
```



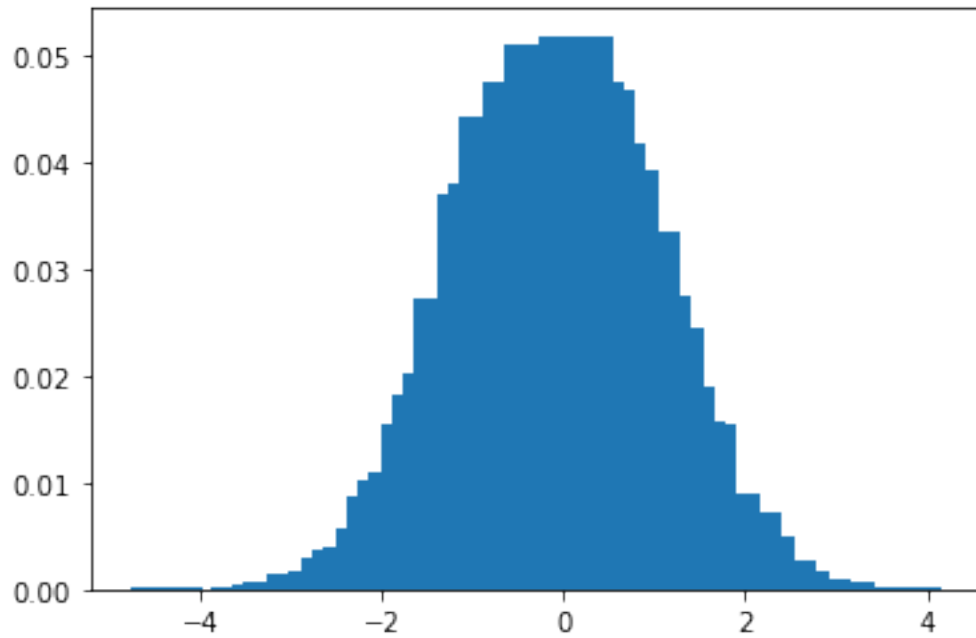
```
[4]: CLT(poi, 5000, 10000)
```



[5]: `CLT(expon(scale=1/0.5), 5000, 10000)`

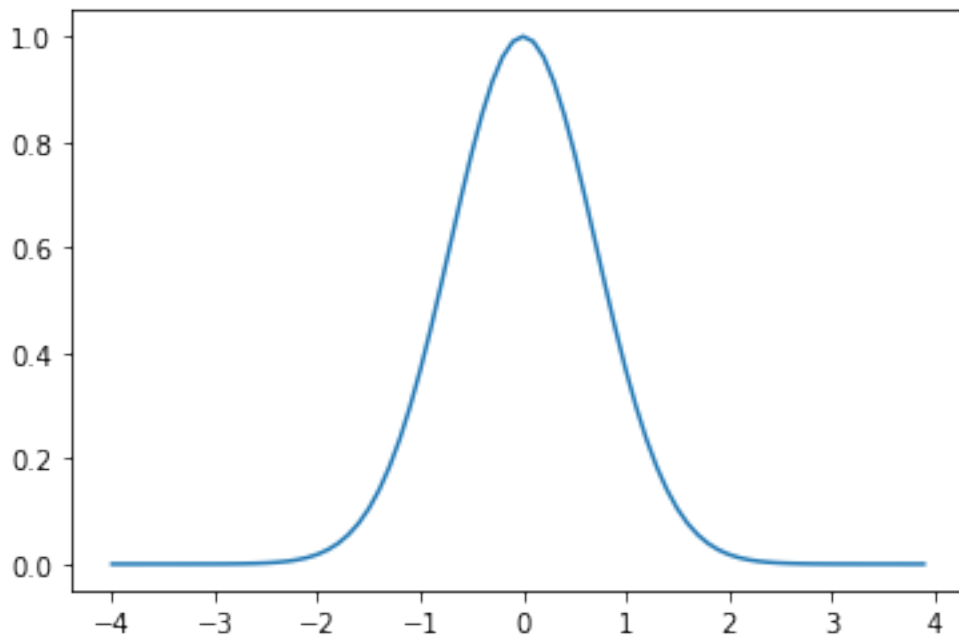


[6]: `CLT(binom(30, 0.1), 5000, 10000)`



```
[7]: import matplotlib.pyplot as plt
import numpy as np

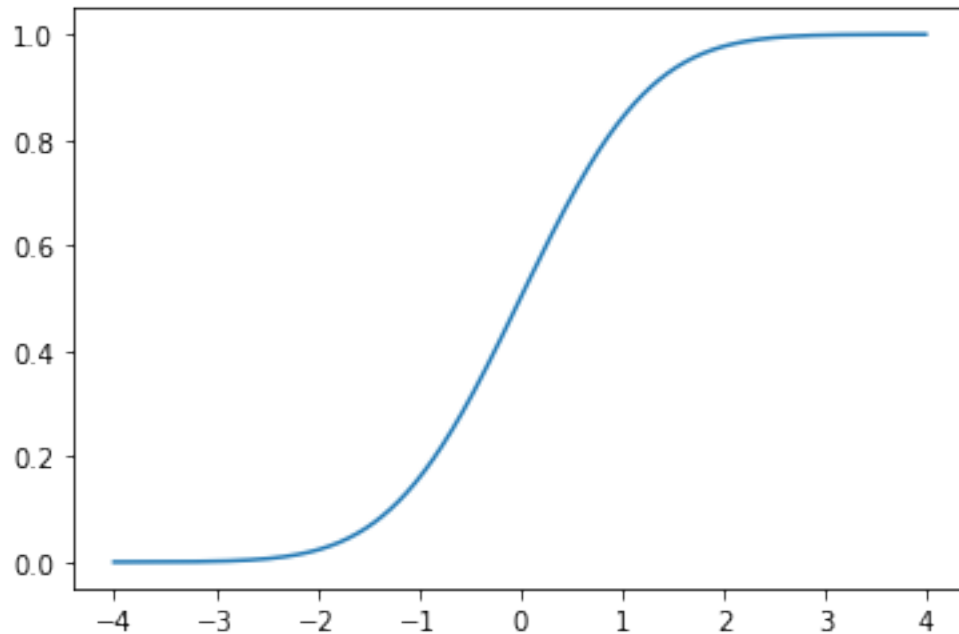
x = np.arange(-4.0, 4.0, 0.1)
plt.plot(x, np.exp(-x*x))
plt.show()
```



```
[8]: from scipy.stats import norm
```

```
x_axis = np.arange(-4, 4, 0.01)  
#  $N(0,1)$  dichte  
plt.plot(x_axis, norm.cdf(x_axis,0,1))
```

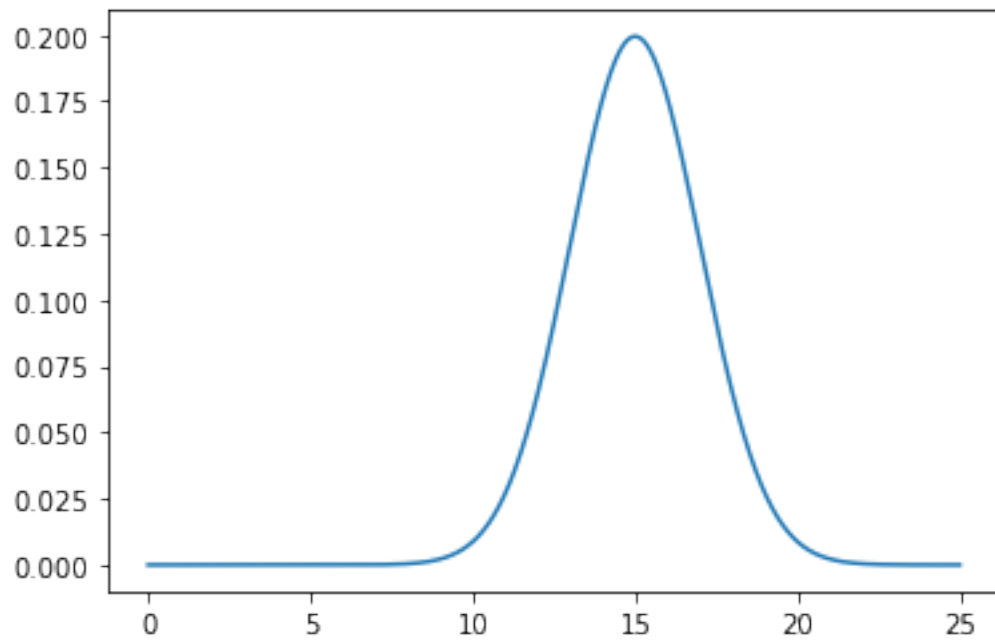
```
[8]: [<matplotlib.lines.Line2D at 0x7ffe5070c550>]
```



```
[9]: x_axis = np.arange(0, 25, 0.001)
```

```
# Mean = 0, SD = 2.  
plt.plot(x_axis, norm.pdf(x_axis,15,2))
```

```
[9]: [<matplotlib.lines.Line2D at 0x7ffe60716790>]
```



```
[10]: normvolt = norm(loc=15, scale=2)
```

```
[11]: normvolt.cdf(13) + (1-normvolt.cdf(17))
```

```
[11]: 0.31731050786291415
```

```
[ ]:
```