Rozwiazania

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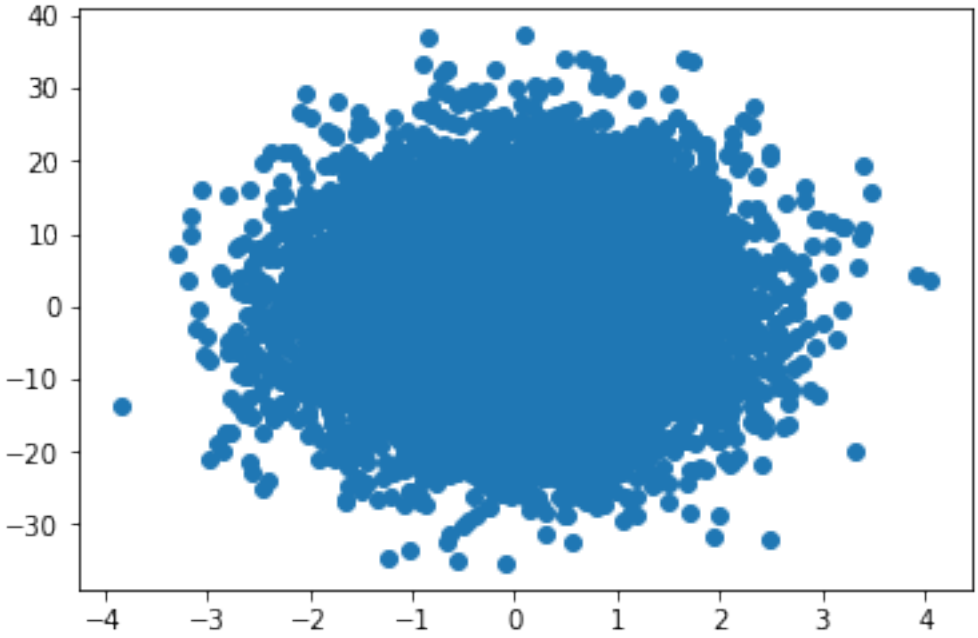
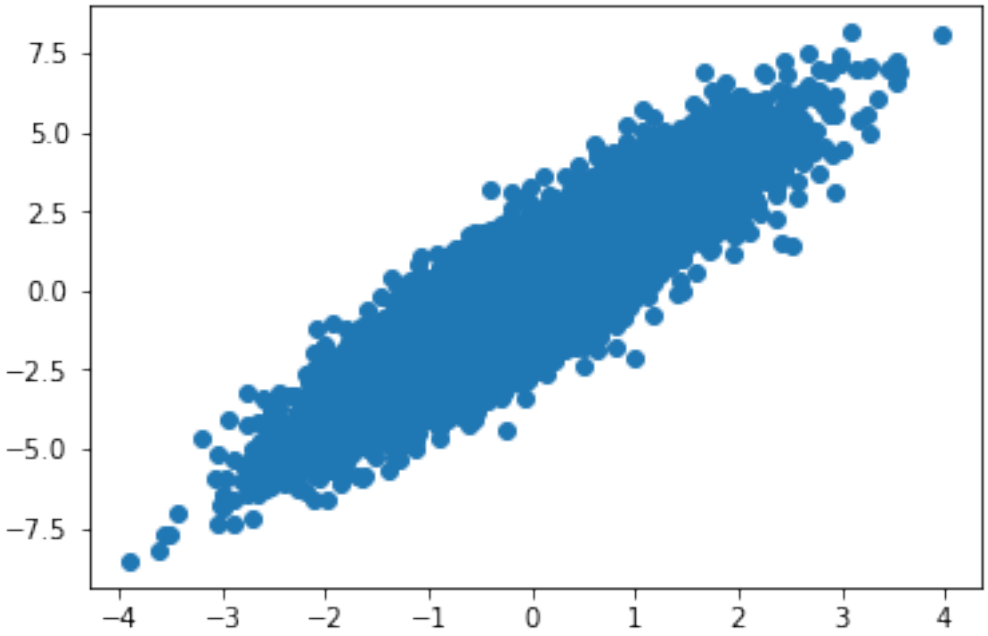
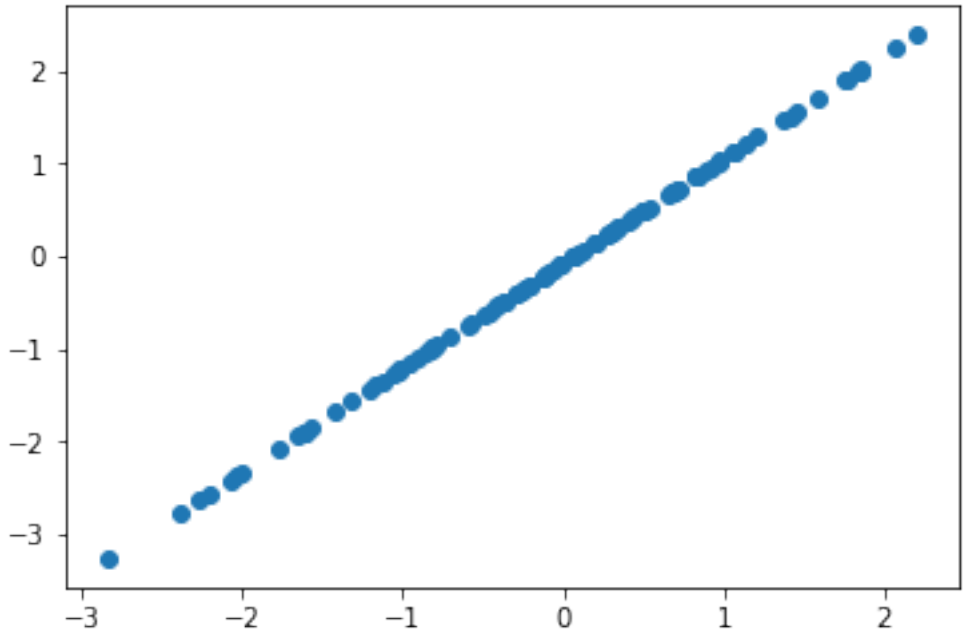
In [69]:
```
import matplotlib.pyplot as plt
import numpy as np
mean = [0, 0]
cov = [[1, 0], [0, 100]]
x,y = np.random.multivariate_normal(mean, cov, 10000).T
plt.scatter(x,y)
plt.show()
```



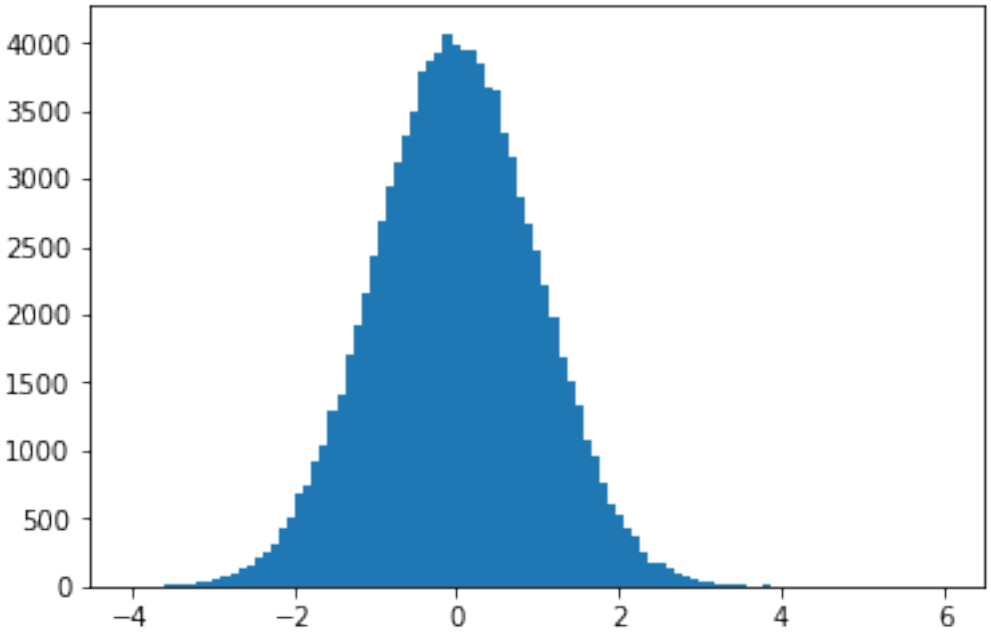
In [70]:
```
mean = [0, 0]
cov = [[1, 2], [2, 5]]
x,y= np.random.multivariate_normal(mean, cov, 10000).T
plt.scatter(x,y)
plt.show()
```



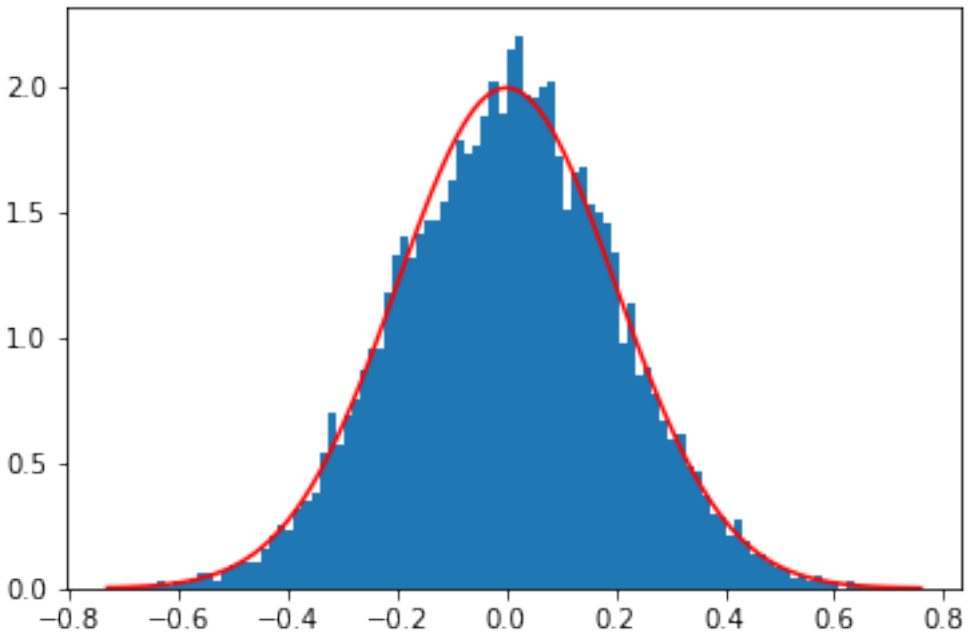

```
In [71]: from sklearn.decomposition import PCA
         mean, cov, n = [0, 0], [[1,1],[1,1.5]], 100
         x = np.random.multivariate_normal(mean, cov, n)
         pca = PCA(n_components=1)
         pca.fit(x)
         X_pca = pca.transform(x)
         X_new = pca.inverse_transform(X_pca)
         plot1 = plt.scatter(X_new[:, 0], X_new[:, 1])
         plt.show()
```



In [75]:
```
mean = [0,0]
cov = [[1, 0], [0, 100]]
x,y= np.random.multivariate_normal(mean, cov, 100000).T
bins = np.linspace(-4, 6, 100)
plt.hist(x, bins)
plt.show()
```



In [93]:
```
mean, sigma = 0, 0.2
x = np.random.normal(mean, sigma, 10000)
count, bins, ignored = plt.hist(x, 100, density=True)
plt.plot(bins, 1/(sigma * np.sqrt(2 * np.pi)) *np.exp( - (bins - mean)**2 / (2 * sigma
plt.show()
```



In [38]:
```
from math import pi
import numpy as np
from sympy import *

def multivariate_pdf(cov, mu, n):
    P,D = cov.diagonalize()
    B = P*(D**1/2)
    mu_z = np.zeros(n)
    sigma_z = np.ones(n)
    normal_distribution = np.random.normal(mu_z, sigma_z)
    multivariate = B*Matrix(normal_distribution) + mu
    return multivariate

cov = Matrix([[3, 0.3], [0.3, 2]])
mu = Matrix([0.1, 0.2])
n = 2

multivariate_pdf(cov, mu, n)
```

```
Out[38]: Matrix([
         [13.1438273351563],
         [4.48785303087748]])
```