probability

October 24, 2021

[18]:
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import numpy as np #math library

import matplotlib.pyplot as plt #plotting library

import scipy.stats as st # library for statistics


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# Example for binomial distribution

n_b = 10 #number of consecutive trials
p_b = 0.6 # probability of success
size_b = 1000 # number of experiments run (in our case it shows how many random␣
 ↪numbers we want to generate)

# let's generate numbers from binomial distribution
# here you can change the distribution, just google it
# for example for normal distribtion you would use - st.norm.rvs(...)
data_binom = st.binom.rvs(n = n_b, p = p_b, size = size_b)

# now let's plot our data
plt.figure(figsize = (13,8)) # this one just sets the matplotlib's figure size
plt.hist(data_binom, bins = 50); # plots the histogram, you can change the␣
 ↪number of bins

# if you want to add more histograms to the graph
# just copy the same row again, for example
data_binom1 = st.binom.rvs(n = 20, p = 0.3, size = size_b)
plt.hist(data_binom1, bins = 50);
data_binom2 = st.binom.rvs(n = 50, p = 0.12, size = size_b)
plt.hist(data_binom2, bins = 50);
data_binom3 = st.binom.rvs(n = 100, p = 0.06, size = size_b)
plt.hist(data_binom3, bins = 50);
data_binom4 = st.binom.rvs(n = 500, p = 0.012, size = size_b)
plt.hist(data_binom4, bins = 50);
data_binom5 = st.binom.rvs(n = 1000, p = 0.006, size = size_b)
```

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plt.hist(data_binom5, bins = 50);
Poiss = np.random.poisson(6, 1000)
plt.hist(Poiss, bins = 50);
plt.show();
print("Mean of data_binom", data_binom.mean())
print("Variance of data_binom", data_binom.var())
print("Mean of data_binom1", data_binom1.mean())
print("Variance of data_binom1", data_binom1.var())
print("Mean of data_binom2", data_binom2.mean())
print("Variance of data_binom2", data_binom2.var())
print("Mean of data_binom3", data_binom3.mean())
print("Variance of data_binom3", data_binom3.var())
print("Mean of data_binom4", data_binom4.mean())
print("Variance of data_binom4", data_binom4.var())
print("Mean of data_binom5", data_binom5.mean())
print("Variance of data_binom5", data_binom5.var())
print("Mean of the Poisson distribution", Poiss.mean())
print("Variance of the Poisson distribution ", Poiss.var())
```

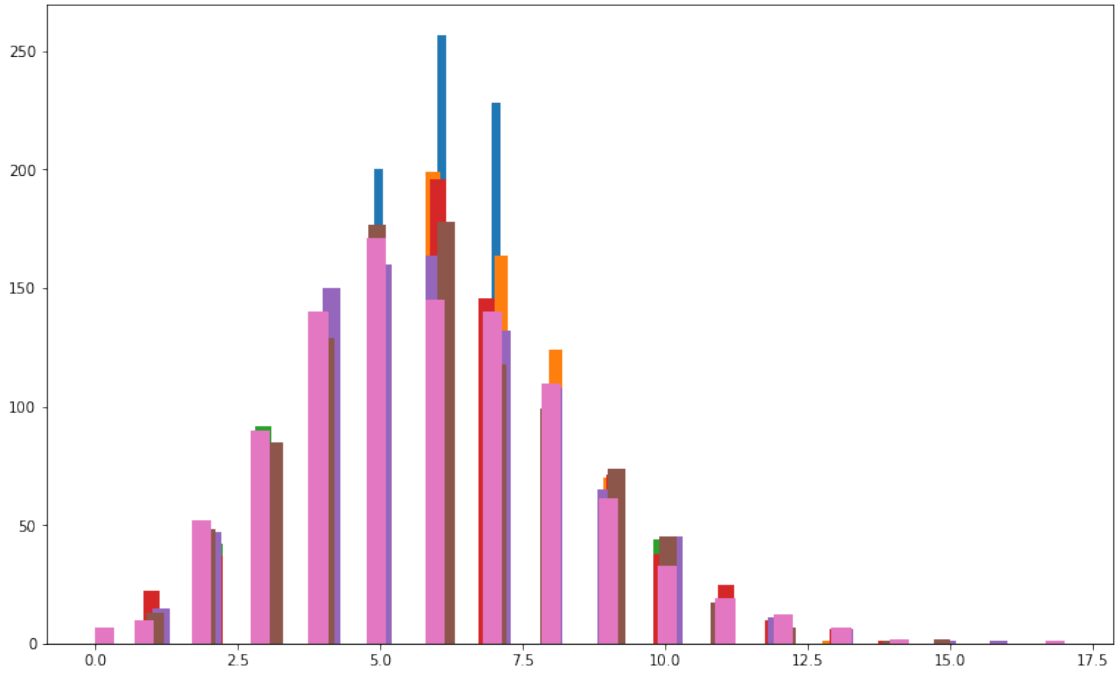


```
Mean of data_binom 5.981
Variance of data_binom 2.270639
Mean of data_binom1 5.965
Variance of data_binom1 3.8977749999999998
Mean of data_binom2 5.897
Variance of data_binom2 4.940391
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```
Mean of data_binom3 6.031
Variance of data_binom3 5.596038999999999
Mean of data_binom4 5.973
Variance of data_binom4 5.776271
Mean of data_binom5 5.947
Variance of data_binom5 5.668191
Mean of the Poisson distribution 5.897
Variance of the Poisson distribution  6.020391
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