

hw1__code

September 29, 2021

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

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[2]: n = 1000
p = 12
```

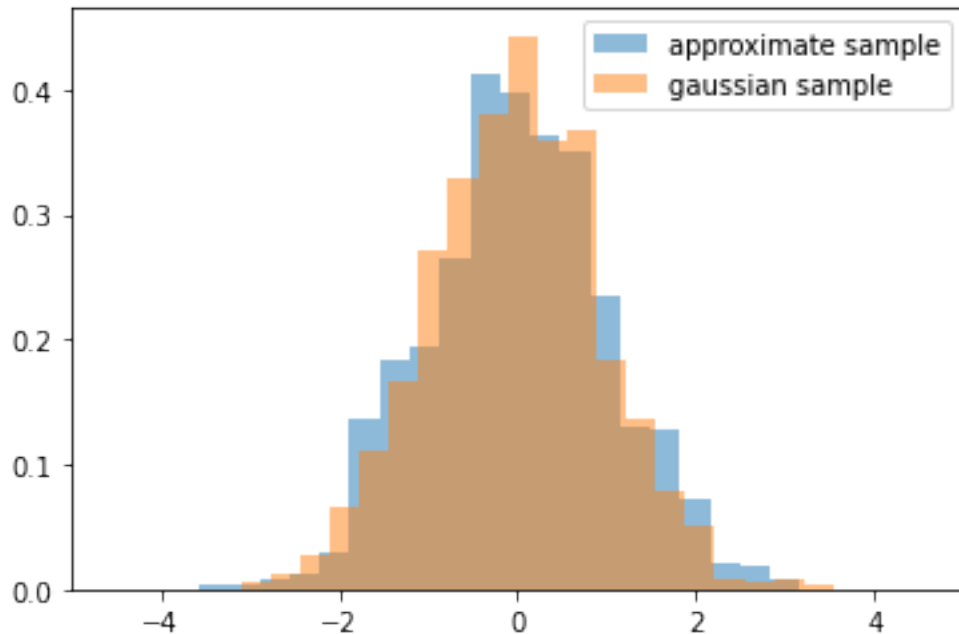
Run Apprioximate Gaussian Sample algorithm n times, and sample n gaussian samples.

```
[3]: s = [np.random.random(p).sum()-6 for i in range(n)]
z = np.random.randn(n)
```

1 Q2-2

```
[8]: plt.hist(s, bins=20, alpha=0.5, density=True, label="approximate sample")
plt.hist(z, bins=20, alpha=0.5, density=True, label="gaussian sample")
plt.xlim(-5, 5)
plt.legend()
plt.plot()
```

```
[8]: []
```



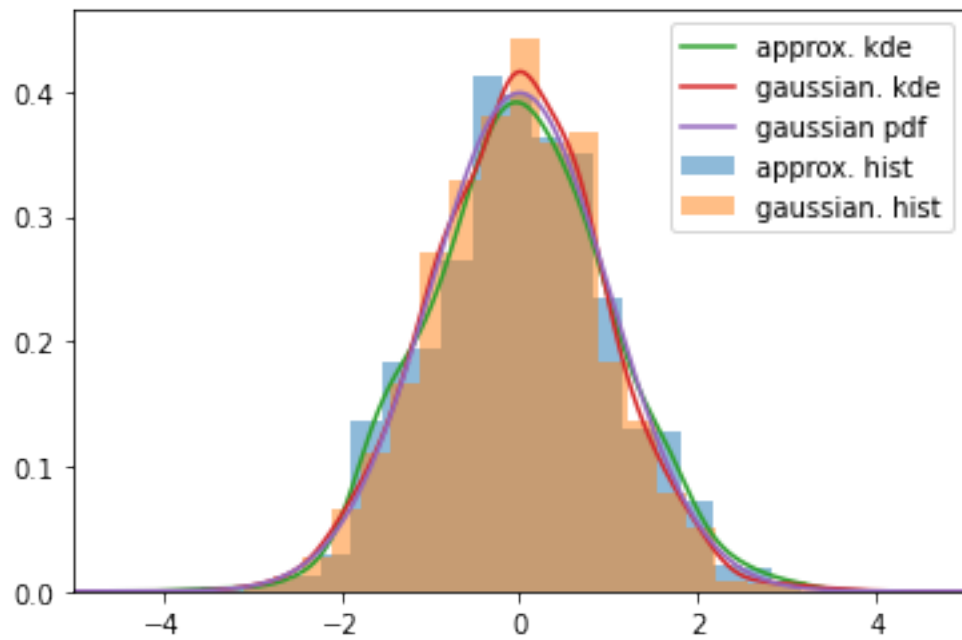
2 Q2-3

```
[13]: from scipy.stats import gaussian_kde
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[14]: gaussian_pdf = lambda x: (2*np.pi)**-0.5*np.exp(-0.5*x**2)
x = np.arange(-5, 5, 0.001)
```

```
[17]: plt.hist(s, bins=20, alpha=0.5, density=True, label="approx. hist")
plt.hist(z, bins=20, alpha=0.5, density=True, label="gaussian. hist")
plt.plot(x, gaussian_kde(s, bw_method='silverman')(x), label="approx. kde")
plt.plot(x, gaussian_kde(z, bw_method='silverman')(x), label="gaussian. kde")
plt.plot(x, gaussian_pdf(x), label="gaussian pdf")
plt.xlim(-5, 5)
plt.legend()
plt.plot()
```

```
[17]: []
```



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