cogsci 131 - assignment1

January 29, 2020
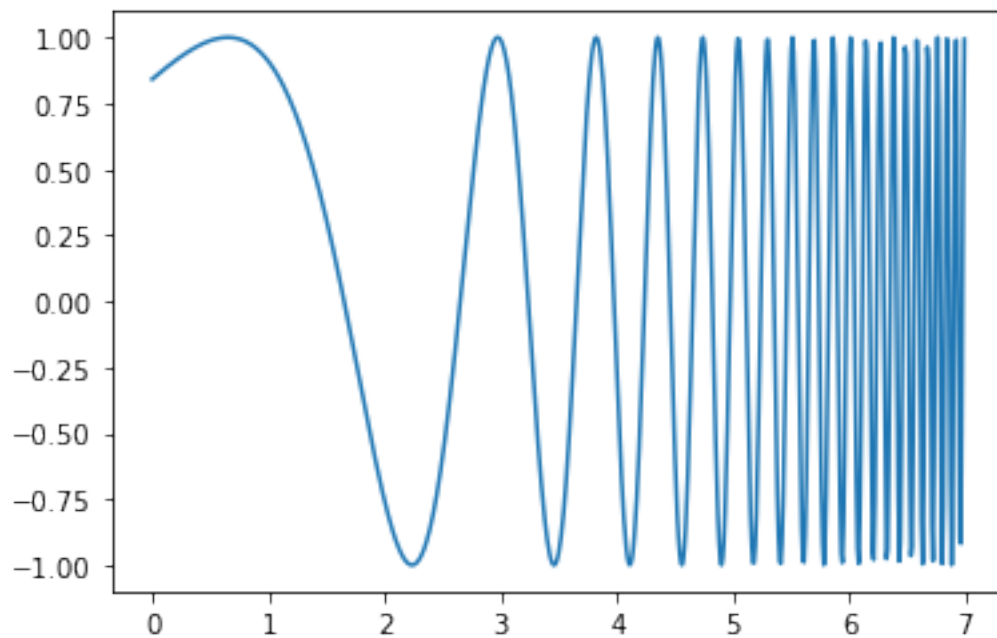
```
[2]: import matplotlib.pyplot as plt
     import numpy as np
```

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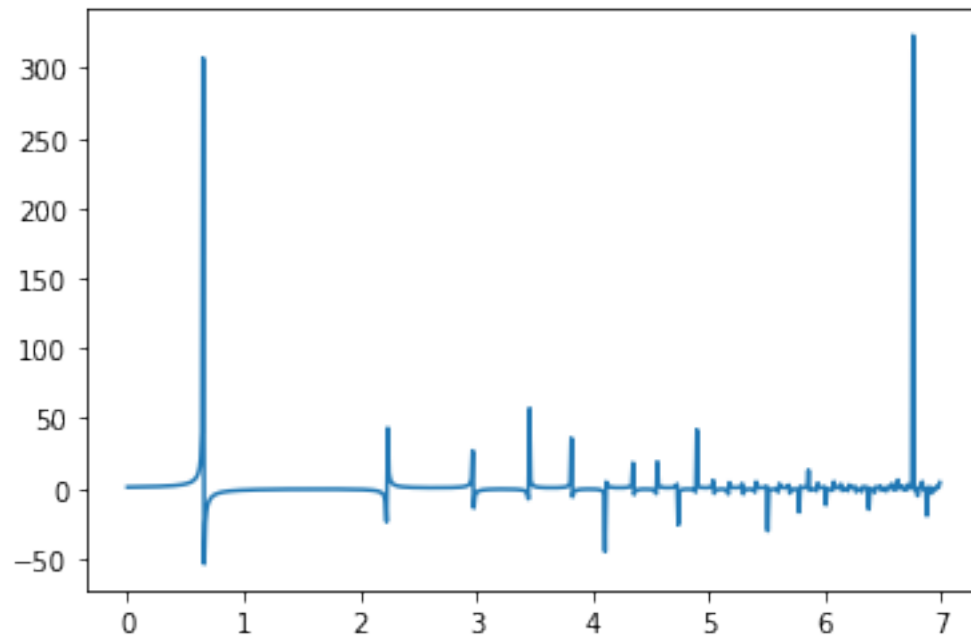Selena Zhang

1.1 Problem 1

```
[9]: x = np.arange(0, 7, 0.01)
     y = np.sin(2**x)
     plt.plot(x, y)
     plt.show()
```

1.2 Problem 2

```
[10]: y_1 = np.sin(2**(x + 1))
      g = y/y_1
      plt.plot(x, g)
      plt.show()
```

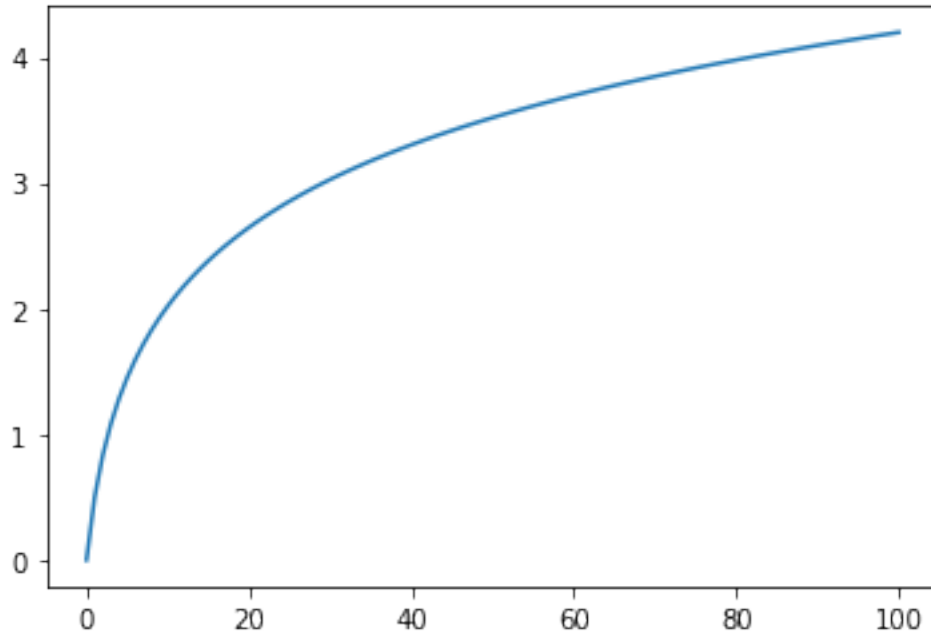### 1.3 Problem 3a

```
[11]: def summation(n):
          result = 0
          for i in range(1, n+1):
              result += 1/(i + 1)
          return result

      #test
      summation(10)
```

[11]: 2.019877344877345
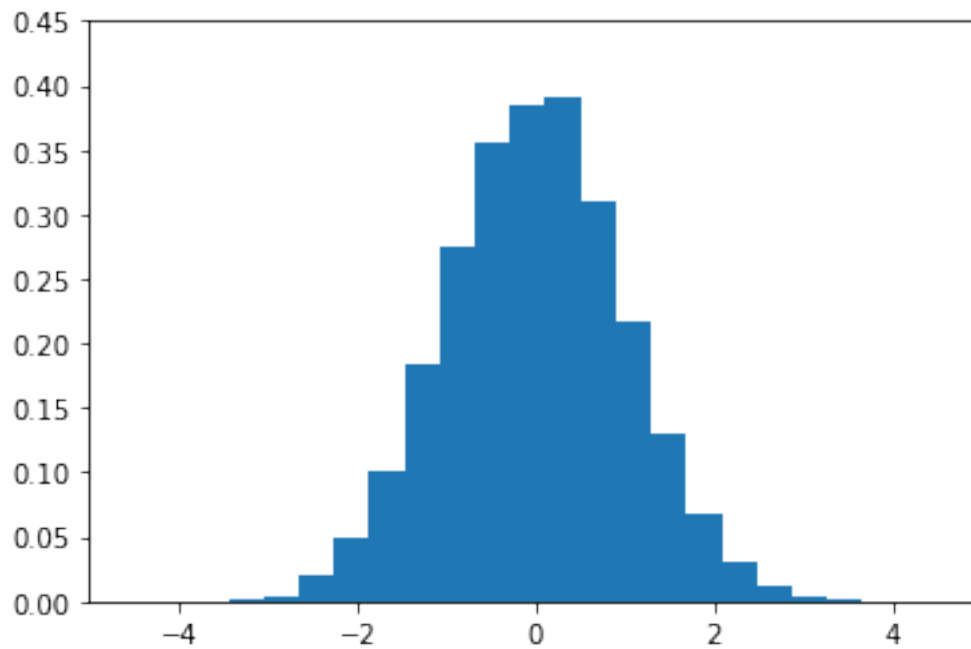
1.4 Problem 3b

```
[12]: summation_function = [summation(j) for j in np.arange(0, 101)]
      plt.plot(np.arange(0, 101), summation_function)
      plt.show()
```

1.5 Problem 4

```
[45]: x_4 = np.random.normal(0, 1, 10001)
      y_4 = np.sin(x_4)

      fig, ax = plt.subplots()
      ax.hist(x_4, bins=20, density=True)
      plt.xlim(-5, 5)
      plt.ylim(0, 0.45)
      plt.show()
```
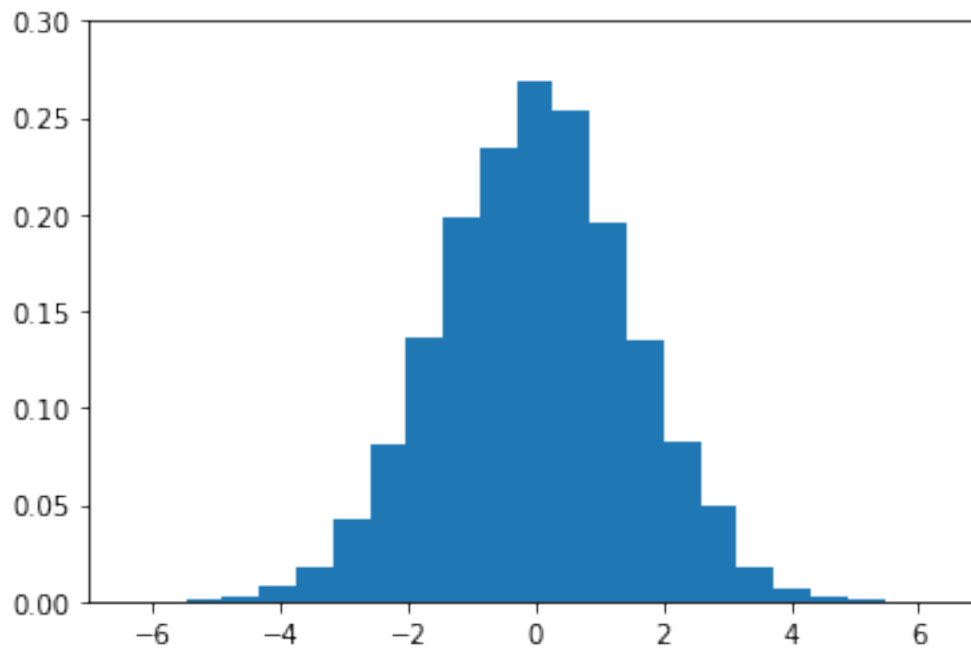
1.6 Problem 5

```
[43]: x_5 = np.random.normal(0, 1.5, 10001)
      y_5 = np.exp(x_5)

      fig, ax = plt.subplots()
      ax.hist(x_5, bins=20, density=True)
      plt.xlim(-7, 7)
      plt.ylim(0, 0.3)
      plt.show()
```
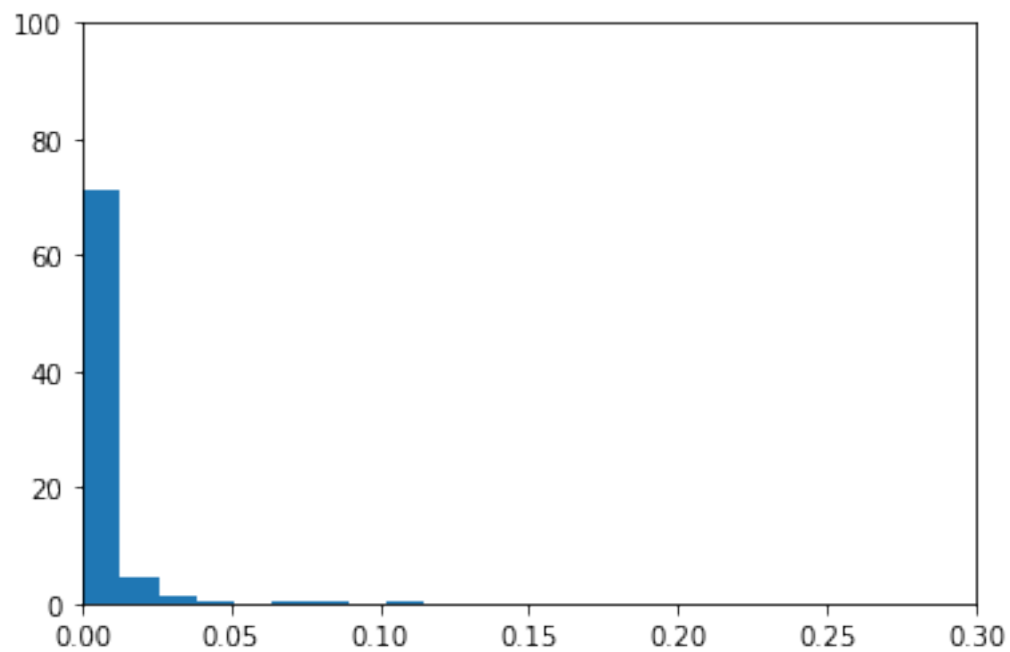
1.7 Problem 6a

```
[66]: np.random.seed(1)
      x_6 = sorted(np.random.normal(0, 1, 1001))

      array = []
      for i in range(0, 1000):
          difference = abs(x_6[i+1] - x_6[i])
          array.append(difference)

      final_array = array

      fig, ax = plt.subplots()
      ax.hist(final_array, bins=50, density=True)
      plt.xlim(0, 0.3)
      plt.ylim(0, 100)
      plt.show()
```

1.8 Problem 6b

```
[67]: x_6b = np.arange(0, 1000)
      y_6b = (final_array)
      plt.plot(x_6b, y_6b)
      plt.show()
```