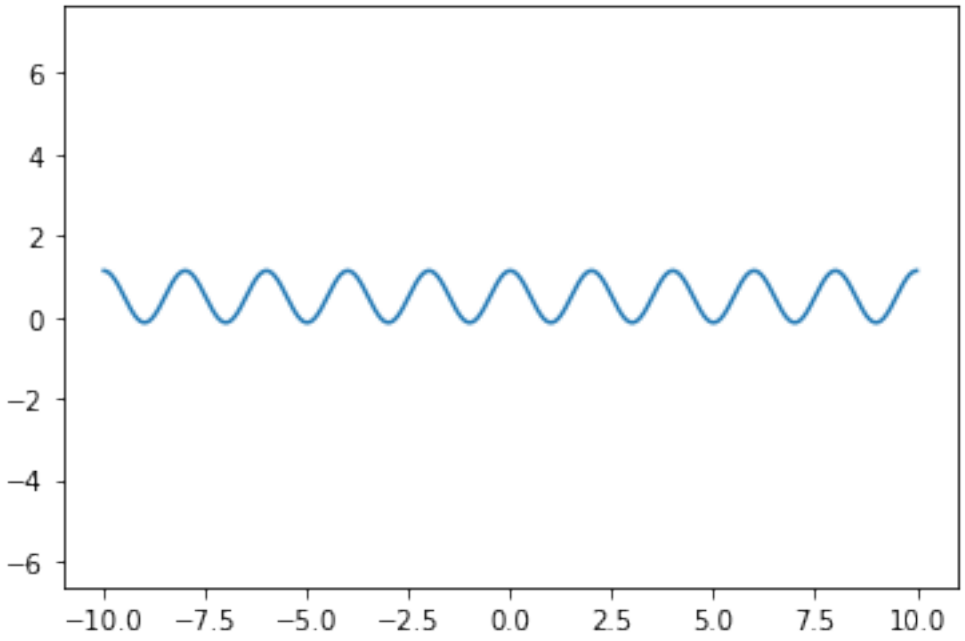
Cornelio,Andrew

April 14, 2020

[8]:
```
import numpy as np
import matplotlib.pyplot as plt
```

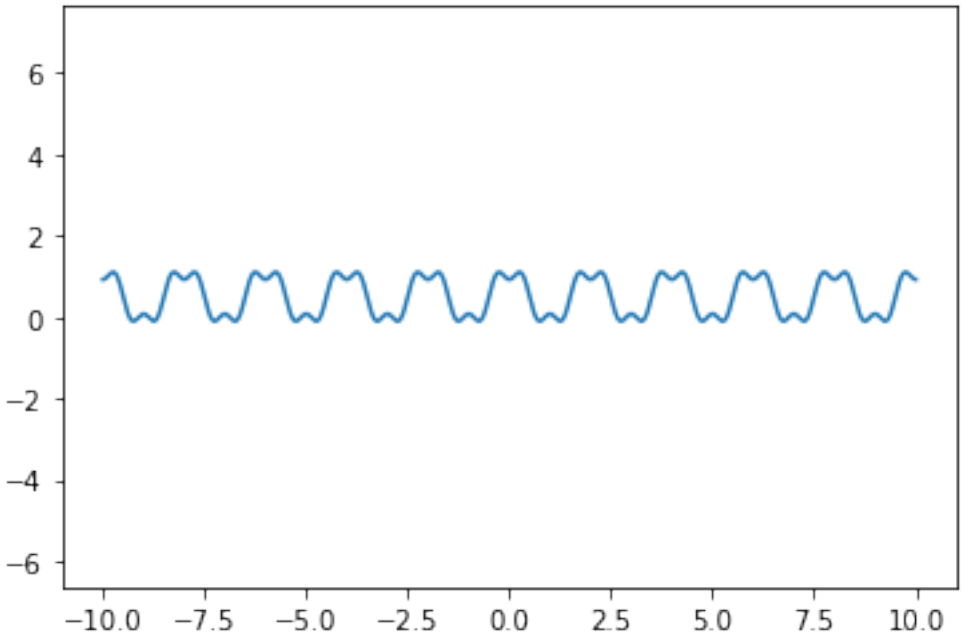
[125]:
```
def A_k(k, a, T):
    return 2/(np.pi * k) * np.sin(np.pi*k*a/T)

def s_n(a, T, t, n):
    s = a/T;
    for k in range(1, n):
        s += A_k(k, a, T) * np.cos(2*np.pi*k*t/T);
    return s;

t = np.arange(-10, 10, .001)
s = s_n(1,2,t, 2);
plt.plot(t, s);
plt.axis('equal');

print(np.amax(np.where(abs(t-1)<1, s, 0))-1)
```

```
0.1366197723675815
```



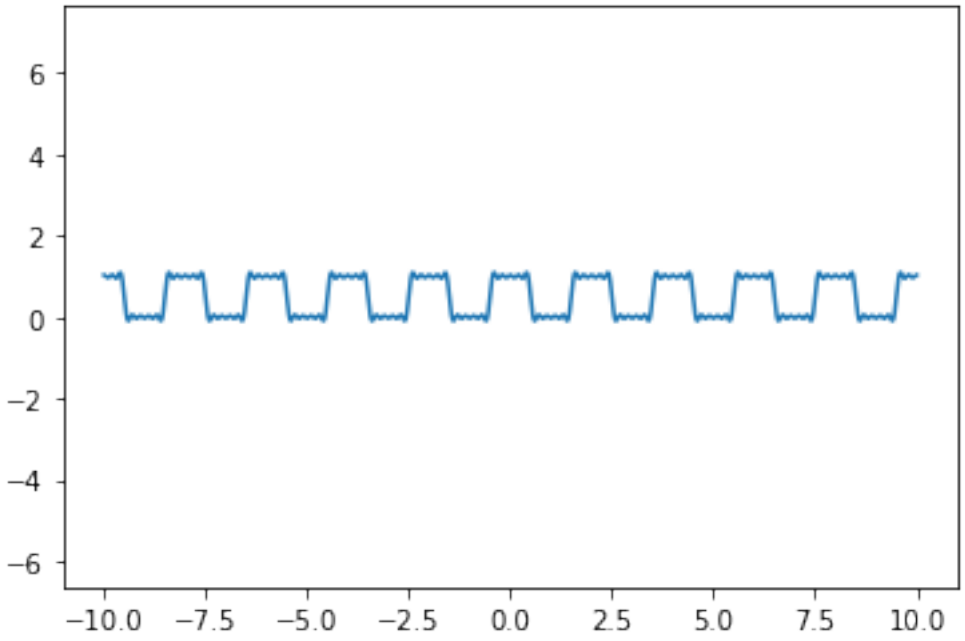
[126]:
```
t = np.arange(-10, 10, .001)
s = s_n(1,2,t, 5);
plt.plot(t, s);
plt.axis('equal');

print(np.amax(np.where(abs(t-1)<1, s, 0))-1)
```

```
0.10021087743807078
```



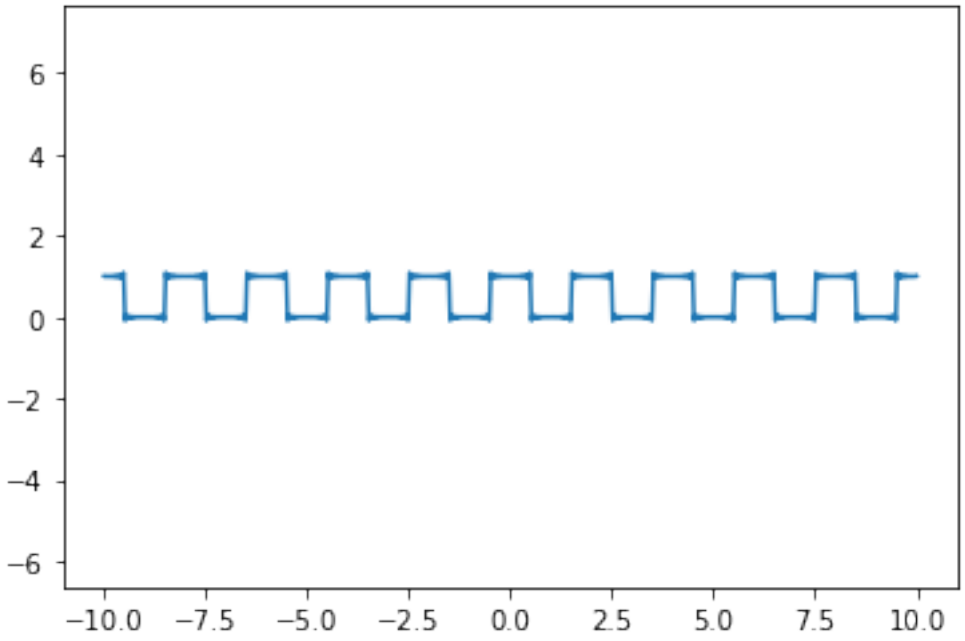
[127]:
```
t = np.arange(-10, 10, .001)
s = s_n(1,2,t, 10);
plt.plot(t, s);
plt.axis('equal');

print(np.amax(np.where(abs(t-1)<1, s, 0))-1)
```

```
0.09116410442880318
```



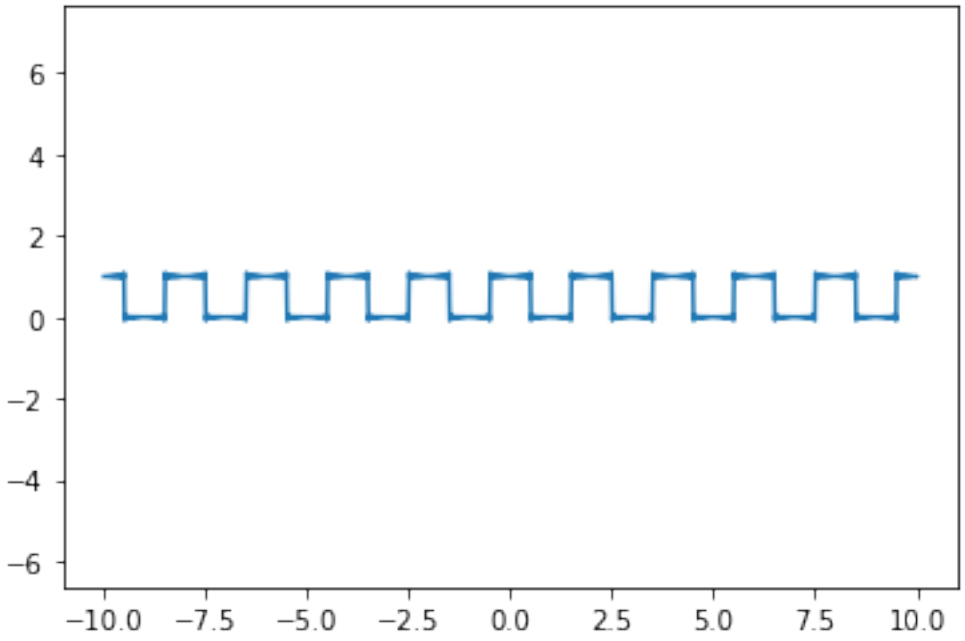
[128]:
```
t = np.arange(-10, 10, .001)
s = s_n(1,2,t, 50);
plt.plot(t, s);
plt.axis('equal');

print(np.amax(np.where(abs(t-1)<1, s, 0))-1)
```

```
0.08955655094414672
```



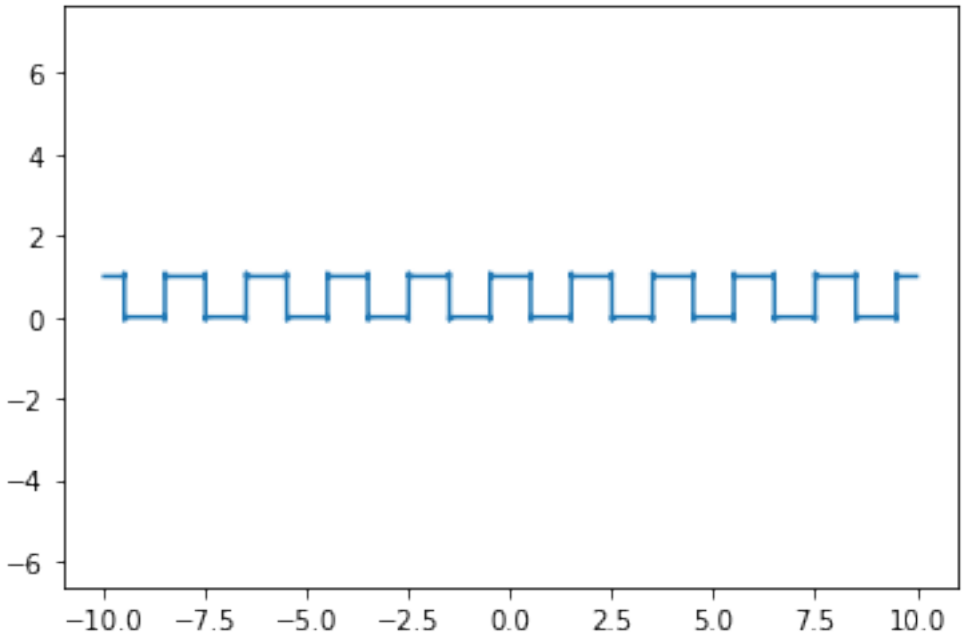
[129]:
```
t = np.arange(-10, 10, .001)
s = s_n(1,2,t, 100);
plt.plot(t, s);
plt.axis('equal');

print(np.amax(np.where(abs(t-1)<1, s, 0))-1)
```

```
0.08950653965521416
```

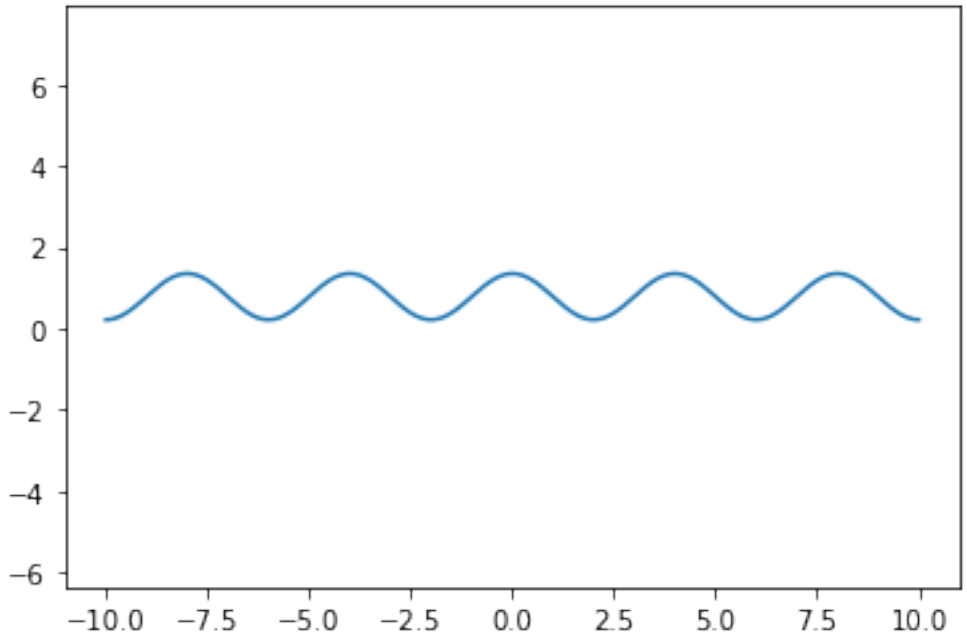


[130]:
```
t = np.arange(-10, 10, .001)
s = s_n(1,2,t, 1000);
plt.plot(t, s);
plt.axis('equal');

print(np.amax(np.where(abs(t-1)<1, s, 0))-1)
```

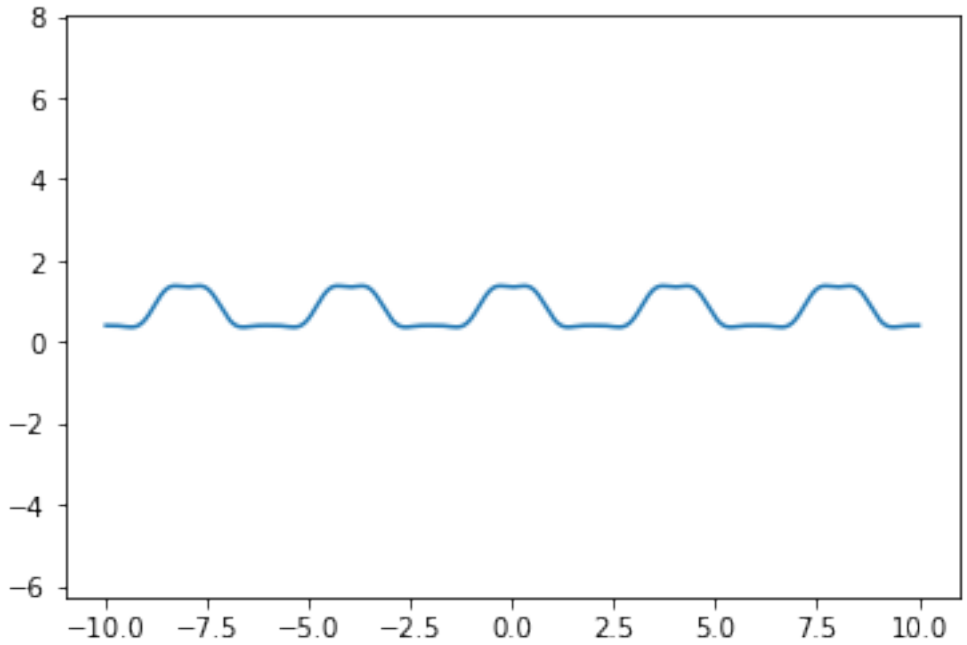
```
0.08949003890281992
```



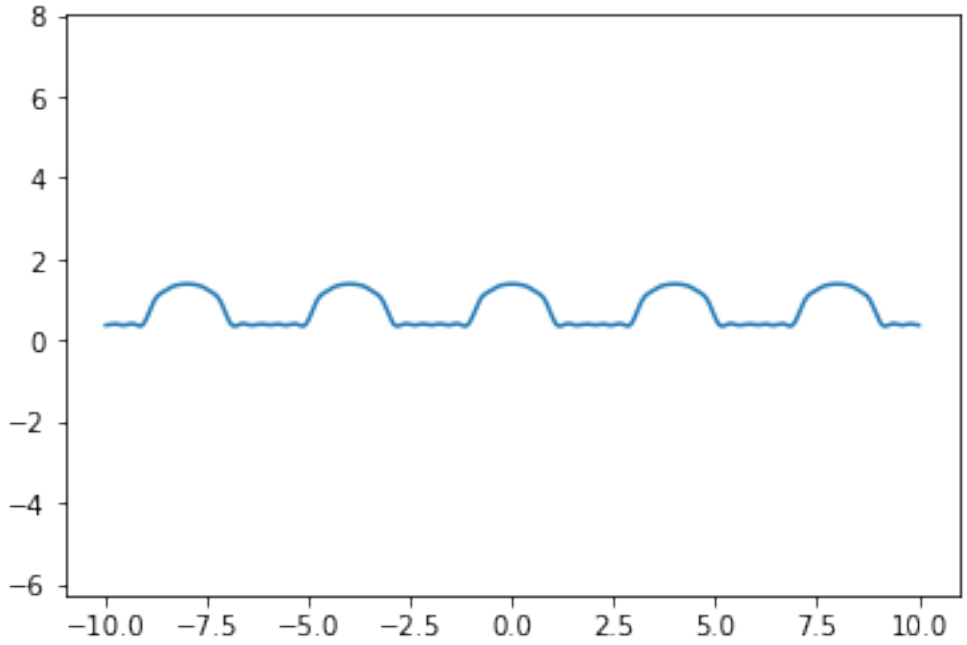
[132]:
```
def a_k(k, m, T):
    t = np.arange(-1, 1, m)
    return 2/T * np.sum(np.sqrt(1- t**2) * np.cos(2*np.pi*k*t/T) * m)

def s_n(T, t, n):
    m = 0.001
    s = np.pi/T;
    for k in range(1, n):
        s += a_k(k, m, T) * np.cos(2*np.pi*k*t/T);
    return s;

t = np.arange(-10, 10, .001)
s = s_n(4, t, 2);
plt.plot(t, s);
plt.axis('equal');
```



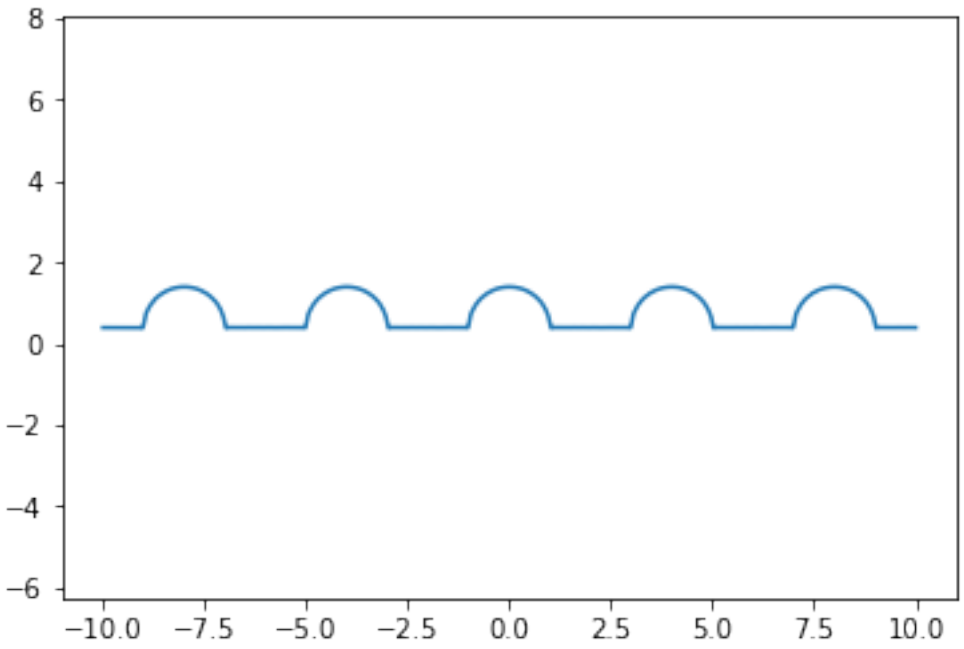
[133]:
```
t = np.arange(-10, 10, .001)
s = s_n(4, t, 5);
plt.plot(t, s);
plt.axis('equal');
```



[134]:
```
t = np.arange(-10, 10, .001)
s = s_n(4, t, 10);
plt.plot(t, s);
plt.axis('equal');
```



[135]:
```
t = np.arange(-10, 10, .001)
s = s_n(4, t, 50);
plt.plot(t, s);
plt.axis('equal');
```



[136]:
```
t = np.arange(-10, 10, .001)
s = s_n(4, t, 100);
plt.plot(t, s);
plt.axis('equal');
```