lista2(jansolarz)

July 4, 2021

In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
import math
%matplotlib inline
import numpy as np
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
```

In [ ]:

In [3]:
```
x = np.linspace(-1, 1)
y = np.linspace(-2, 2)
z= math.sin(3*(math.sin((x**2)+(y**2))))
```

```
---------------------------------------------------------------------------

TypeError                                 Traceback (most recent call last)

<ipython-input-3-4b279aef59da> in <module>()
  1 x = np.linspace(-1, 1)
  2 y = np.linspace(-2, 2)
----> 3 z= math.sin(3*(math.sin((x**2)+(y**2))))


TypeError: only size-1 arrays can be converted to Python scalars
```

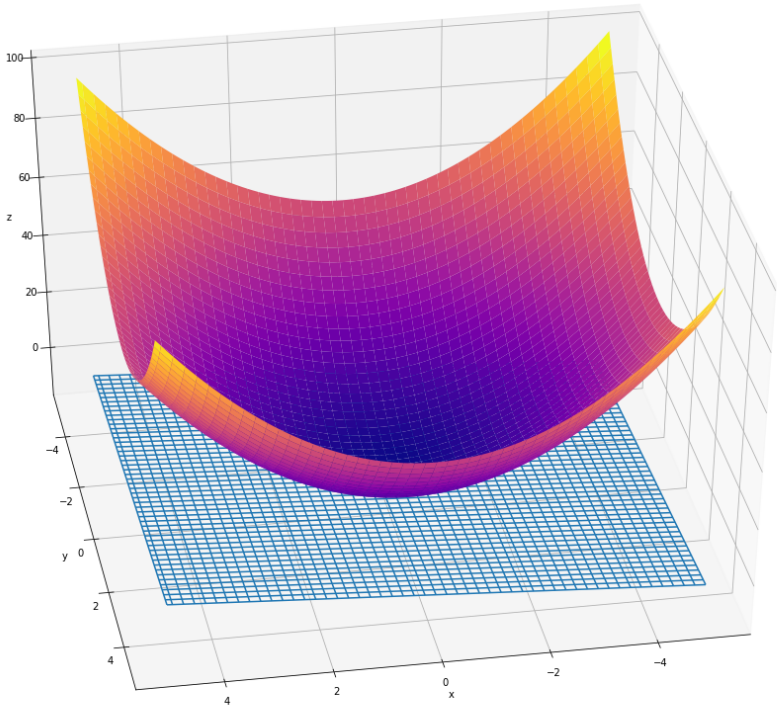
In [ ]:
```
import numpy as np
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
```

In [ ]:
```
#zad.4
x = np.arange(-1, 1,0.1)
y = np.arange(-2, 2,0.2)
X, Y = np.meshgrid(x, y)
Z= np.sin(3*(np.sin((X**2)+(Y**2))))
```

```
        #Z[Z<X+Y]=-8

        #Z2[Z>X+Y]=-8

        fig = plt.figure(figsize=(10,6))
        ax = fig.gca(projection='3d')
        ax.view_init(45, -48)
        ax.plot_wireframe(X,Y,Z)
        ax.plot_surface(X,Y,Z,cmap='plasma')
        #ax.plot_wireframe(X, Y, Z, cmap='plasma')

        ax.set_xlabel('x')
        ax.set_ylabel('y')
        ax.set_zlabel('2xy')
        plt.show()
```

In [4]:
```
        y1 = np.sin(2*x)
        y1 = np.cos(3*x)
```

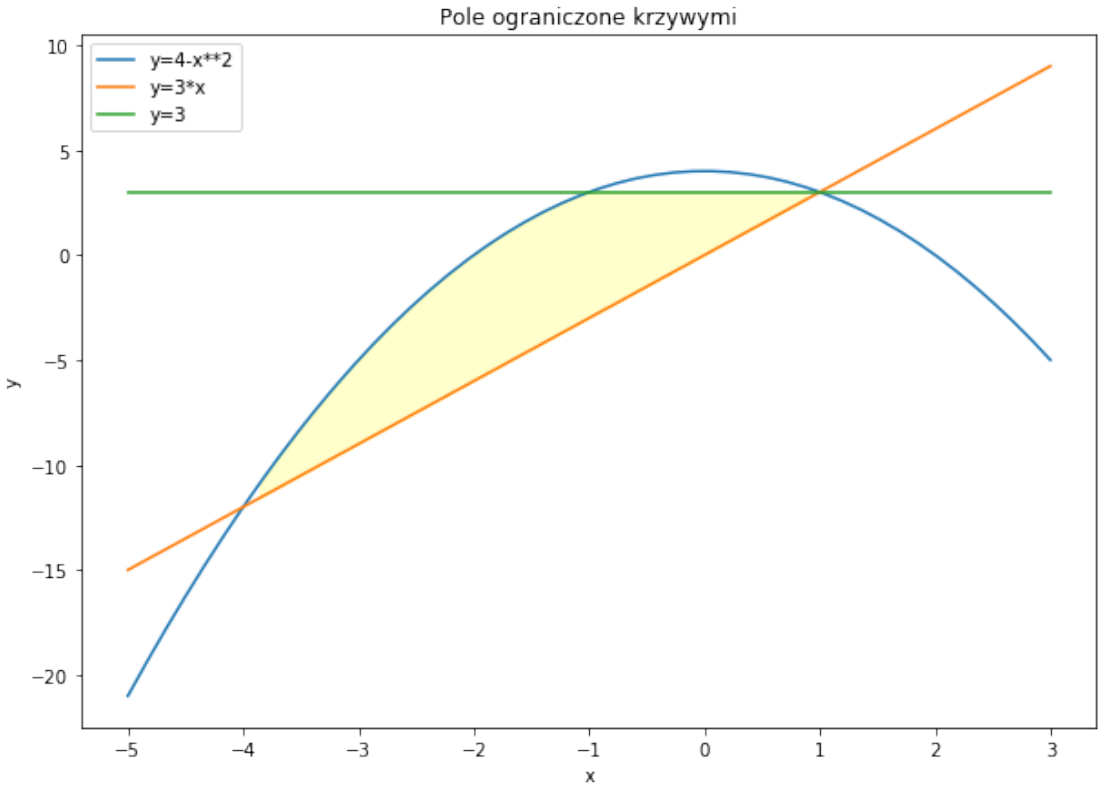
In [5]:
```
        #zad.5
        import numpy as np
        import matplotlib.pyplot as plt
        from mpl_toolkits.mplot3d import Axes3D
        from matplotlib import cm
        x = np.arange(-5, 5,0.1)
        y = np.arange(-5, 5,0.2)
        X, Y = np.meshgrid(x, y)


        Z= (X**2+Y**2)/0.5
        Z2=X+Y-5
        fig = plt.figure(figsize=(20,15))
        ax = fig.gca(projection='3d')
        ax.view_init(40, 80)
        ax.plot_wireframe(X,Y,Z2, cmap=cm.viridis)
        ax.plot_surface(X,Y,Z,cmap='plasma')
        #ax.plot_wireframe(X, Y, Z, cmap='plasma')

        ax.set_xlabel('x')
        ax.set_ylabel('y')
        ax.set_zlabel('z')
        plt.show()
```



In [7]: *#zad.3*

```
x = np.linspace(-5, 3)
y1 = 4-x**2
y2=3*x
y3 = 0*x+3
y4 = np.minimum(y1, y3)

plt.subplots(figsize=(10,7))
plt.plot(x, y1, label='y=4-x**2')
plt.plot(x, y2, label='y=3*x')
plt.plot(x, y3, label='y=3')


plt.fill_between(x, y2, y4, where=y1>y2, color='yellow', alpha=0.2)



plt.legend(loc='best')
plt.xlabel('x')
```

```
plt.ylabel('y')
plt.title('Pole ograniczone krzywymi')
plt.show()
```

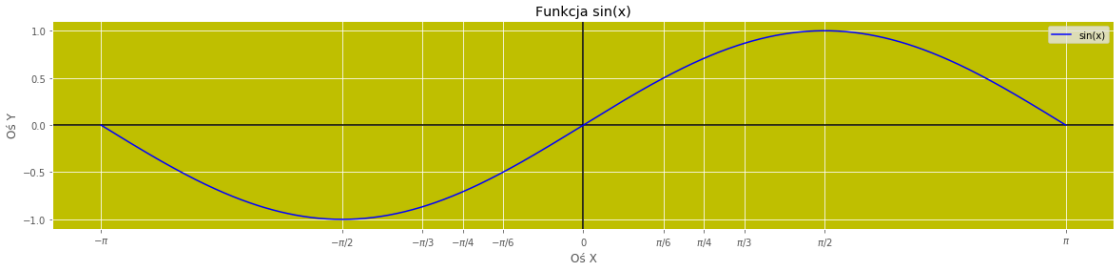



```
In [51]: print(np.pi)
```

```
3.141592653589793
```

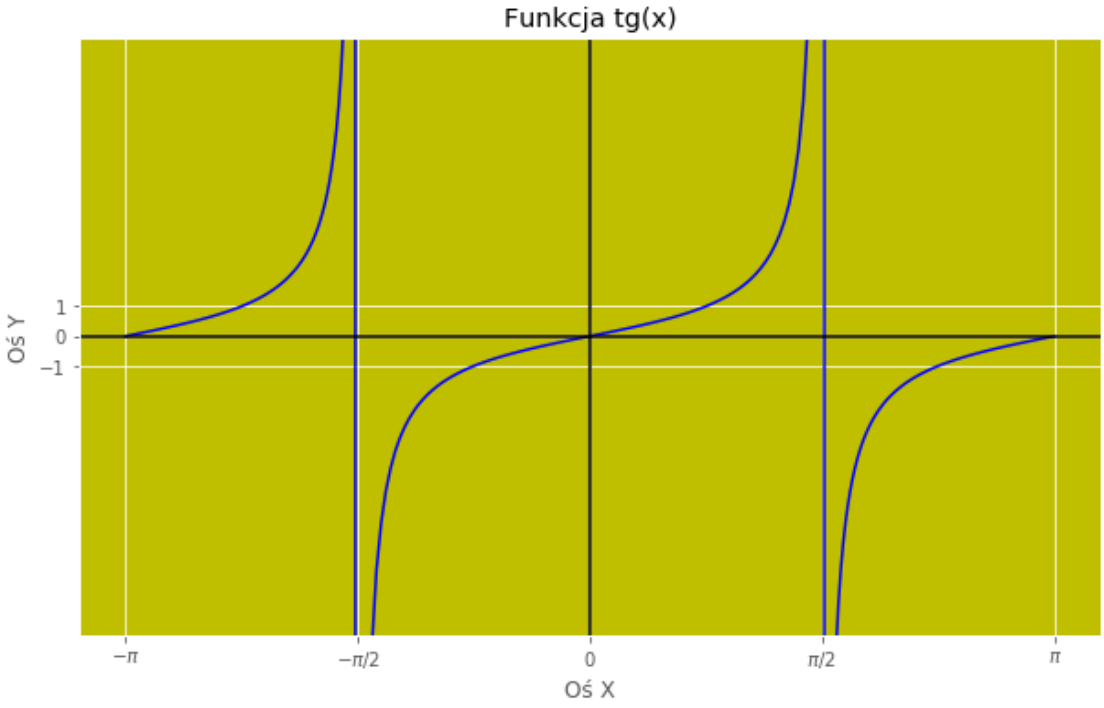
```
In [171]: #zad.1
          #sin(x)

          import matplotlib.ticker as tck
          import matplotlib.pyplot as plt
          import pylab
          import numpy as np
          f,ax=plt.subplots(figsize=(20,4))
          x=np.linspace(-np.pi,np.pi,1000)
          y=np.sin(x)


          ax.set_facecolor('y')
```

```
plt.axhline(0, color='black')
plt.axvline(0, color='black')



plt.xlabel('O X')
plt.ylabel('O Y')
plt.title('Funkcja sin(x)')
plt.grid(True)
plt.plot(x, y, 'b', label='sin(x)')
plt.legend(loc='best')


plt.xticks([-np.pi,-np.pi/2,-np.pi/3,-np.pi/4,-np.pi/6,0,np.pi/6,np.pi/4,np.pi/3,np.p
           ['$-\pi$','$-\pi$/2','$-\pi$/3','$-\pi$/4','$-\pi$/6','$0$','$\pi$/6','$\pi

plt.yticks([-1,-0.5,0,0.5,1,])




plt.show()
```



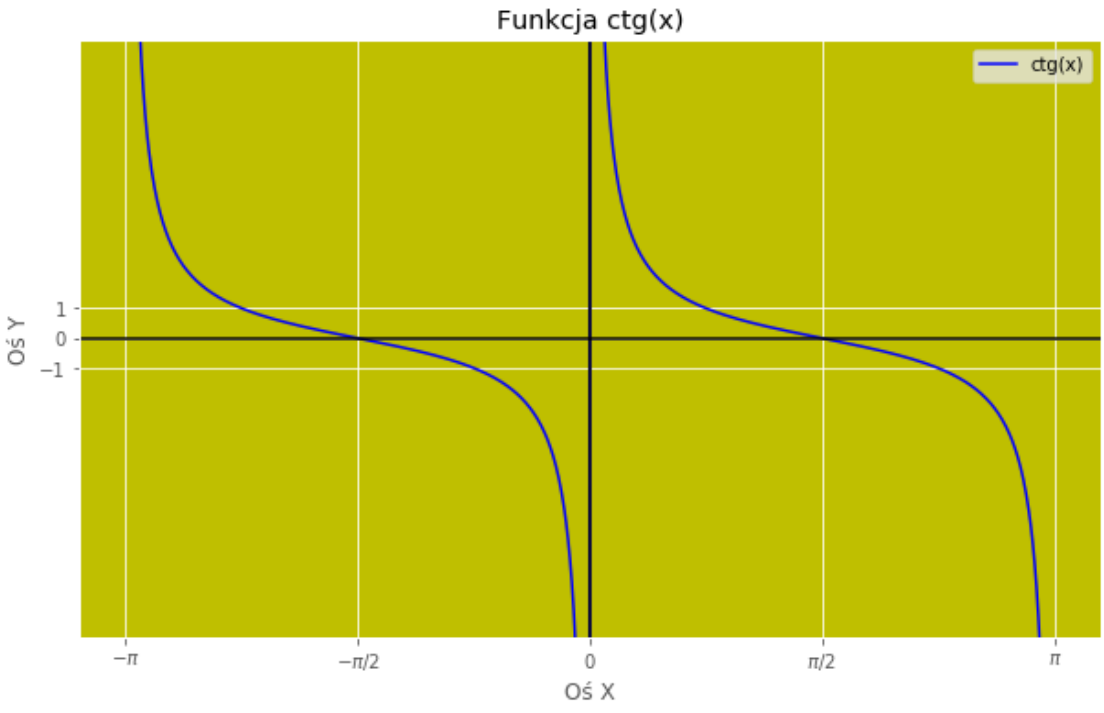
In [179]:
```
#tg(x)
f,ax=plt.subplots(figsize=(10,6))
x1 = np.linspace(-np.pi, -np.pi/2, 100)
x2 = np.linspace(-np.pi/2, np.pi/2, 100)
x3 = np.linspace(np.pi/2, np.pi, 100)
ax.plot(x1, np.tan(x1),'b')
ax.plot(x2, np.tan(x2),'b')
ax.plot(x3, np.tan(x3),'b')
x = np.linspace(-np.pi,np.pi, 1000)
ax.set_ylim(-10, 10)


ax.set_facecolor('y')
plt.axhline(0, color='black')
```

```
plt.axvline(0, color='black')



plt.xlabel('O X')
plt.ylabel('O Y')
plt.title('Funkcja tg(x)')
plt.grid(True)



plt.xticks([-np.pi,-np.pi/2,0,np.pi/2,np.pi],\
           ['$-\pi$','$-\pi$/2','$0$','$\pi$/2','$\pi$'])

plt.yticks([-1,0,1])



plt.show()
```



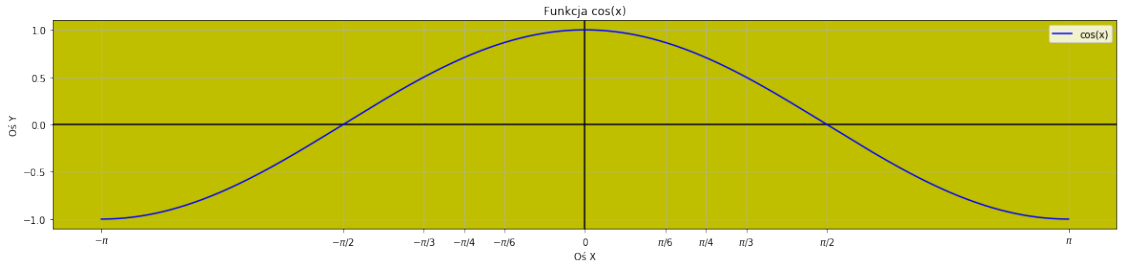
In [174]:
```
#ctg(x)
f,ax=plt.subplots(figsize=(10,6))
plt.plot(x, np.cos(x)/np.sin(x), color='blue', label='ctg(x)')
```

```
x = np.linspace(-np.pi,np.pi, 1000)
ax.set_ylim(-10, 10)


ax.set_facecolor('y')
plt.axhline(0, color='black')
plt.axvline(0, color='black')



plt.xlabel('O X')
plt.ylabel('O Y')
plt.title('Funkcja ctg(x)')
plt.grid(True)
plt.legend(loc='best')


plt.xticks([-np.pi,-np.pi/2,0,np.pi/2,np.pi],\
          ['$-\pi$','$-\pi$/2','$0$','$\pi$/2','$\pi$'])

plt.yticks([-1,0,1])



plt.show()
```



In [13]: *#cos(x)*

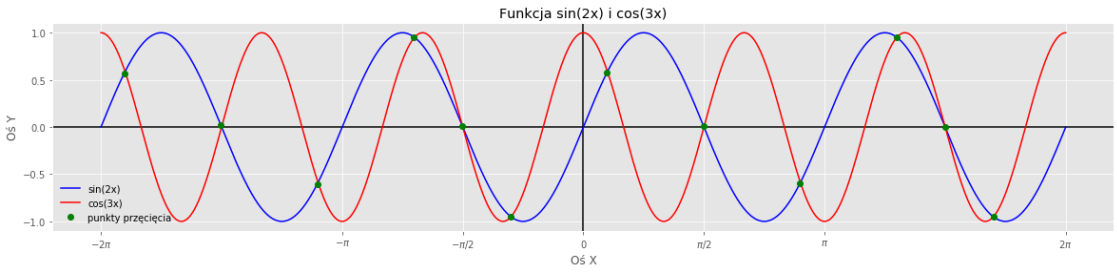
```
import matplotlib.ticker as tck
import matplotlib.pyplot as plt
import pylab
import numpy as np
f,ax=plt.subplots(figsize=(20,4))
x=np.linspace(-np.pi,np.pi,1000)
y=np.cos(x)


ax.set_facecolor('y')
plt.axhline(0, color='black')
plt.axvline(0, color='black')



plt.xlabel('O X')
plt.ylabel('O Y')
plt.title('Funkcja cos(x)')
plt.grid(True)
plt.plot(x, y, 'b', label='cos(x)')
plt.legend(loc='best')


plt.xticks([-np.pi,-np.pi/2,-np.pi/3,-np.pi/4,-np.pi/6,0,np.pi/6,np.pi/4,np.pi/3,np.pi
          ['$-\pi$','$-\pi$/2','$-\pi$/3','$-\pi$/4','$-\pi$/6','$0$','$\pi$/6','$\pi$

plt.yticks([-1,-0.5,0,0.5,1,])



plt.savefig('cos.png')
plt.show()
```



In [180]:
```
#zad.2
```

In [200]:
```
f,ax=plt.subplots(figsize=(20,4))
x=np.linspace(-2*np.pi,2*np.pi,1000)
y1=np.sin(2*x)
y2=np.cos(3*x)
plt.axhline(0, color='black')
plt.axvline(0, color='black')

plt.xlabel('O X')
plt.ylabel('O Y')
plt.title('Funkcja sin(2x) i cos(3x)')
plt.grid(True)
plt.plot(x, y1, 'b', label='sin(2x)')
plt.plot(x, y2, 'r', label='cos(3x)')
plt.legend(loc='best')


plt.xticks([-2*np.pi,-np.pi,-np.pi/2,0,np.pi/2,np.pi, 2*np.pi],\
           ['$-2\pi$','$-\pi$','$-\pi$/2','$0$','$\pi$/2','$\pi$', '$2\pi$'])
plt.yticks([-1,-0.5,0,0.5,1,])

idx = np.argwhere(np.diff(np.sign(y1 - y2))).flatten()
plt.plot(x[idx], y1[idx], 'go', label='punkty przcicia')
plt.legend(loc='best', frameon=False)
print(x[idx], y1[idx])
```

```
[-5.98129052 -4.72339556 -3.4655006  -2.20760565 -1.57865817 -0.94971069
  0.30818426  1.56607922  2.82397418  4.08186913  4.71081661  5.33976409] [ 0.56776609  0.0220
  0.57807576  0.00943407 -0.59336826  0.95240778  0.00314473 -0.95047176]
```



In [ ]:
```
```