exp7:sigmoid plotting and exor gate using sigmoid

import matplotlib.pyplot as plt

import numpy as np

import math

from mpl\_toolkits import mplot3d

def h11(x1,x2):

    return 1/(1 + np.exp((-x1)-(100\*x2)-200))

def h12(x1,x2):

    return 1/(1 + np.exp((-x1)-(100\*x2)+200))

def h13(x1,x2):

    return 1/(1 + np.exp((-100\*x1)-(x2)-200))

def h14(x1,x2):

    return 1/(1 + np.exp((-100\*x1)-(x2)+200))

def f(x1,x2):

    return 1/(1 + np.exp((-100\*Z31)+100))

x1 = np.linspace(-10, 10, 100)

x2 = np.linspace(-10, 10, 100)

X1, X2 = np.meshgrid(x1, x2)

H11 = h11(X1, X2)

H12 = h12(X1, X2)

H13 = h13(X1, X2)

H14 = h14(X1, X2)

H21=Z11-Z12

H22=Z13-Z14

H31=Z21+Z22

F=f(X1,X2)

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H11, rstride=1, cstride=1,

                cmap='viridis', edgecolor='r')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h11(x1,x2)')

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H12, rstride=1, cstride=1,

                cmap='viridis', edgecolor='b')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h12(x1,x2)')

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H13, rstride=1, cstride=1,

                cmap='viridis', edgecolor='g')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h13(x1,x2)')

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H14, rstride=1, cstride=1,

                cmap='viridis', edgecolor='r')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h14(x1,x2)')

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H21, rstride=1, cstride=1,

                cmap='viridis', edgecolor='b')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h21(x1,x2)')

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H22, rstride=1, cstride=1,

                cmap='viridis', edgecolor='r')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h22(x1,x2)')

fig = plt.figure()

ax = plt.axes(projection='3d')

ax.plot\_surface(X1, X2, H31, rstride=1, cstride=1,

                cmap='viridis', edgecolor='none')

ax.set\_xlabel('x')

ax.set\_ylabel('y')

ax.set\_zlabel('z')

ax.set\_title('h31(x1,x2)')



Sigmoid for exor gate

x1 = [0,0,1,1]

x2 = [0,1,0,1]

w = 1

b=1

def sigmoid\_fun(a):

    return 1/(1+np.exp(-a))

output = []

for i in range(4):

    a1= w\*x1[i] + w\*x2[i] +b

    y1\_cap = sigmoid\_fun(a1)

    a2= w\*x1[i] + w\*x2[i]+b

    y2\_cap = sigmoid\_fun(a2)

    a3 = w\*y1\_cap + w\*y2\_cap +b

    y2 = sigmoid\_fun(a3)

    output.append(y2)

print(output)

**output:**

[0.9214430516601156, 0.9405648141721128, 0.9405648141721128, 0.9481003474891515]