CW (TensorFlow, Metoda gradientu)

```
import random
import tensorflow as tf
import numpy as np
np.random.seed(50)

def init():
    X = tf.Variable(np.random.uniform(-10,10),  trainable=True)
    Y = tf.Variable(np.random.uniform(-10,10),  trainable=True)
    return X, Y

def function(X,Y):
    return (3*X**4+4*X**3-12*X**2+12*Y**2-24*Y)
X, Y= init1()
min=function(X.numpy(),Y.numpy())
for i in range(5):
    optimizer = tf.optimizers.SGD(learning_rate=0.01,  momentum=0.99)
    for epoch in range(1000):
        optimizer.minimize(lambda:  function(X,Y), var_list=[X, Y])
        print((function(X,  Y)).numpy(),  X.numpy(),  Y.numpy(),  end="\r")
    print(X.numpy(),  Y.numpy(),  function(X,Y).numpy())
    X, Y= init1()
```

Metoda (Gradientu)

c = 0 (CW)

C = 0.001
momentum = 0.9
=> -44 !

C = 0.01
mometum = 0

$$w^{new} = w^{old} - c\frac{\partial E}{\partial x} + momentum$$