EJE1ALGORITHMCUASI-NEWTON

April 3, 2023

1 Algorítmo CUASI-NEWTON

[2]:
```
#Primero importemos todas las librerías a utilizar.
import numpy as np
from scipy.optimize import minimize
import matplotlib.pyplot as plt
```

[3]:
```
#Definamos nuestra función para este algorítmo se tomaran en cuenta únicamente␣
↪las funciones cuadráticas.
```

[4]:
```
def quadratic(x, A, b, c):
    return 0.5 * x.dot(A.dot(x)) - b.dot(x) + c

def no_constraint(x):
    return None
```

[5]:
```
#Ahora definimos nuestro método CUASI-NEWTON.
```

[6]:
```
def optimize(objective, initial_guess):
    result = minimize(objective, initial_guess, method='BFGS',␣
↪constraints={'fun': no_constraint})
    return result.x, result.fun
```

[7]:
```
#Finalmente grafiquemos.
```

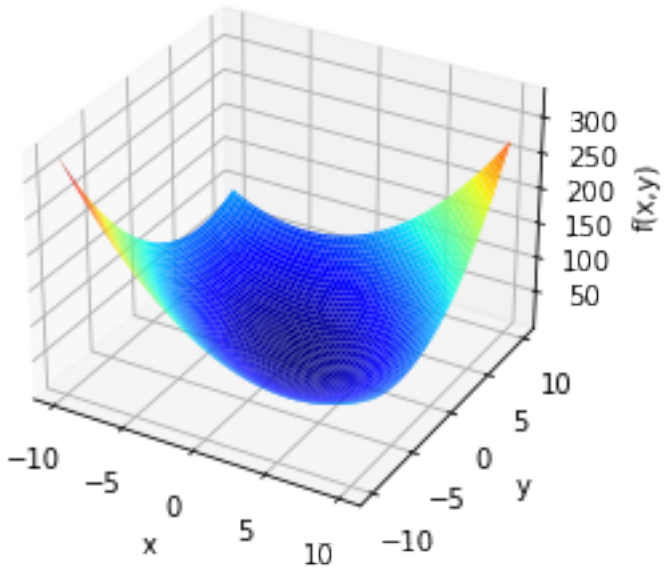
[8]:
```
def plot_quadratic(A, b, c):
    fig = plt.figure()
    ax = fig.gca(projection='3d')
    x = np.linspace(-10, 10, 100)
    y = np.linspace(-10, 10, 100)
    X, Y = np.meshgrid(x, y)
    Z = np.zeros((100, 100))
    for i in range(100):
        for j in range(100):
            Z[i,j] = quadratic(np.array([X[i,j], Y[i,j]]), A, b, c)
    ax.plot_surface(X, Y, Z, cmap='jet')
    ax.set_xlabel('x')
```

```
    ax.set_ylabel('y')
    ax.set_zlabel('f(x,y)')
    plt.show()

A = np.array([[2, 1], [1, 2]])
b = np.array([1, 2])
c = 3
x0 = np.array([0, 0])

plot_quadratic(A, b, c)
x_opt, f_opt = optimize(lambda x: quadratic(x, A, b, c), x0)
print("Punto óptimo: ", x_opt)
print("Valor mínimo: ", f_opt)
```

```
C:\Users\ASUS\AppData\Local\Temp\ipykernel_14856\3798746762.py:3:
MatplotlibDeprecationWarning: Calling gca() with keyword arguments was
deprecated in Matplotlib 3.4. Starting two minor releases later, gca() will take
no keyword arguments. The gca() function should only be used to get the current
axes, or if no axes exist, create new axes with default keyword arguments. To
create a new axes with non-default arguments, use plt.axes() or plt.subplot().
  ax = fig.gca(projection='3d')
```




```
Punto óptimo:  [1.61335598e-06 1.00000308e+00]
Valor mínimo:  2.000000000017055
```

```
[ ]:
```