例 3.6 Python 程序代码

```
from scipy.optimize import minimize
import numpy as np
from matplotlib import pyplot as plt

fig = plt.figure()  # 定义新的三维坐标轴
ax3 = plt.axes(projection='3d')

# 定义三维数据
x1 = np.arange(-5, 5, 0.5)
x2 = np.arange(-5, 5, 0.5)
X, Y = np.meshgrid(x1, x2)
Z = (X - 2) ** 2 + (Y - 1) ** 2

# 作图
ax3.plot_surface(X, Y, Z, cmap='rainbow')
ax3.contour(X, Y, Z, zdim='z', offset=-2, cmap='rainbow')  # 等高线图,要设置 offset,
为 Z 的最小值
plt.show()


def fun(args):
    a, b = args
    v = lambda x: (x[0] - a) ** 2 + (x[1] - b) ** 2
    return v


if __name__ == "__main__":
    # 定义常量值
    args = (2, 1)  # a,b
    # 设置初始猜测值
    x0 = np.asarray((0.5, 0.5))
    res = minimize(fun(args), x0, method='SLSQP')
    print(res.fun)
    print(res.success)
    print(res.x)
```