

EE 524 Machine Learning Lab

Assignment 3(a)

07 October 2020

Plot the following functions using Matplotlib. Use the necessary color scheme. Kindly do all the questions cell wise in a **IPython notebook** or **Colab** so that the plots are visible after running each cell.

1. Put $n = 1$ and 2 . This is the famous **Rastrigin function**. You will get a 2D plot for $n = 1$ and a 3D plot for $n = 2$.

$$f(x_1 \cdots x_n) = 10n + \sum_{i=1}^n (x_i^2 - 10\cos(2\pi x_i))$$

2. Plot the above function for $n = 1$ and 2 . This is known as **Ackley's function**.

$$f(x_0 \cdots x_n) = -20\exp(-0.2\sqrt{\frac{1}{n}\sum_{i=1}^n x_i^2}) - \exp\left(\frac{1}{n}\sum_{i=1}^n \cos(2\pi x_i)\right) + 20 + e$$

3. Put $n = 2$ and plot the function. This is known as the **Sphere function**.

$$f(x_1 \cdots x_n) = \sum_{i=1}^n x_i^2$$

4. Plot the **Rosenbrock function**.

$$f(x_1, x_2) = 100(x_1^2 - x_2)^2 + (1 - x_1)^2$$

5. Plot **McCormick function**.

$$f(x, y) = \sin(x + y) + (x - y)^2 - 1.5x + 2.5y + 1$$

6. Plot **Matyas function**.

$$f(xy) = 0.26(x^2 + y^2) - 0.48xy$$

Do you see any differences between the plots? If yes, what is the main difference?