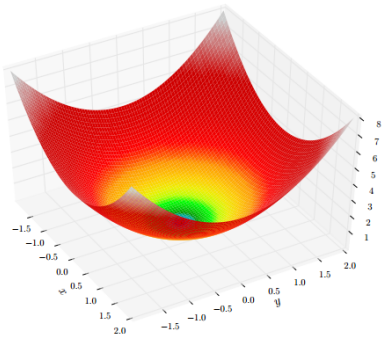
1 Task

Consider the following continuous benchmark function SPHERE:

$SPHERE(x) = \sum_{i=1}^{n} x_i^2 \text{with} - \infty < x < \infty$

The SPHERE function has a unique global minimum in:

$SPHERE(x_1, \ldots, x_n) = SPHERE(0, \ldots, 0) = 0$



and can be visualised for n = 2 as shown above. It is a suitable benchmark to investigate if and how an algorithm starting from some arbitrary point in the search space is able to converge to a local optimum, which is an important property for nature-inspired algorithms.

In the lecture you have learned about two mutation operators in the context of continuous function optimisation, uniform and non-uniform mutation. Here, we consider these and two additional operators, Gaussian mutation with and without 1/5-rule. You can find explanations and pseudo code for all four operators in the appendix of this assignment. Your task is to implement and compare the performance of these four operators on the SPHERE function.