1. Tested Algorithms

In this chapter we present some of the results performed for simple real-valued genetic algorithms which were tuned for benchmark functions (see next section).

1.1. Benchmark functions

Tests were performed for simple, multimodal, two dimensional functions:

- $f(X) = 2e^{-((x+1.1)^2+(y+1.1)^2)} + 1.5e^{-((x-1)^2+y^2)} + 4e^{-3((x+1.5)^2+(y-1.5)^2)}$, where $X \in \mathbb{R}^2$
- $f(X) = e^{-(x^2+y^2)} + 1.4e^{-((x-1.7)^2+(y-1.7)^2)}$, where $X \in \mathbb{R}^2$

1.2. Tests

1.2.1. Accuracy measures

how many optimas have been found, diagrams

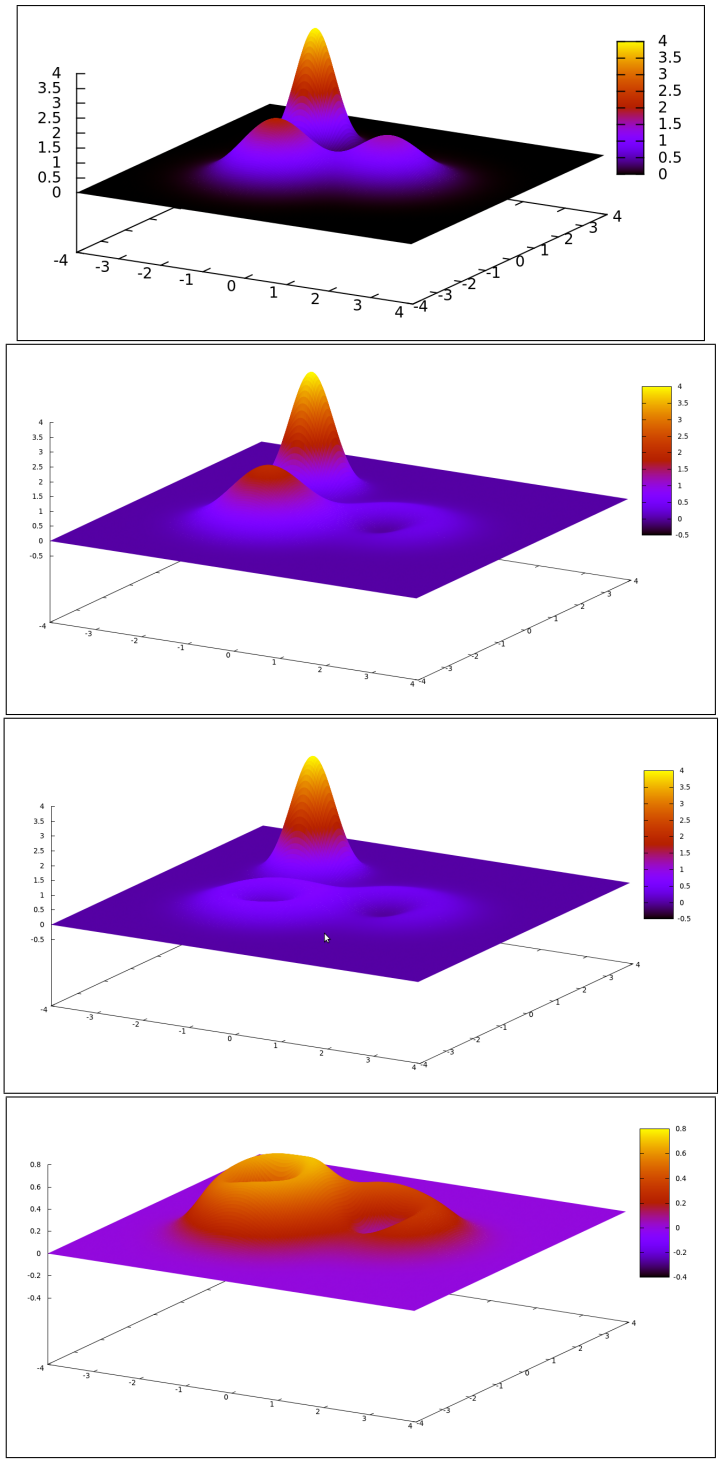

Figure 1.1: The result of sequential niching algorithm applied for the function: $f(X) = 2e^{-((x+1.1)^2+(y+1.1)^2)} + 1.5e^{-((x-1)^2+y^2)} + 4e^{-3((x+1.5)^2+(y-1.5)^2)}$. OPTICS parameters: $\epsilon = 0.5, minPts = 10$, deterioration algorithm: *Weighted scheme*

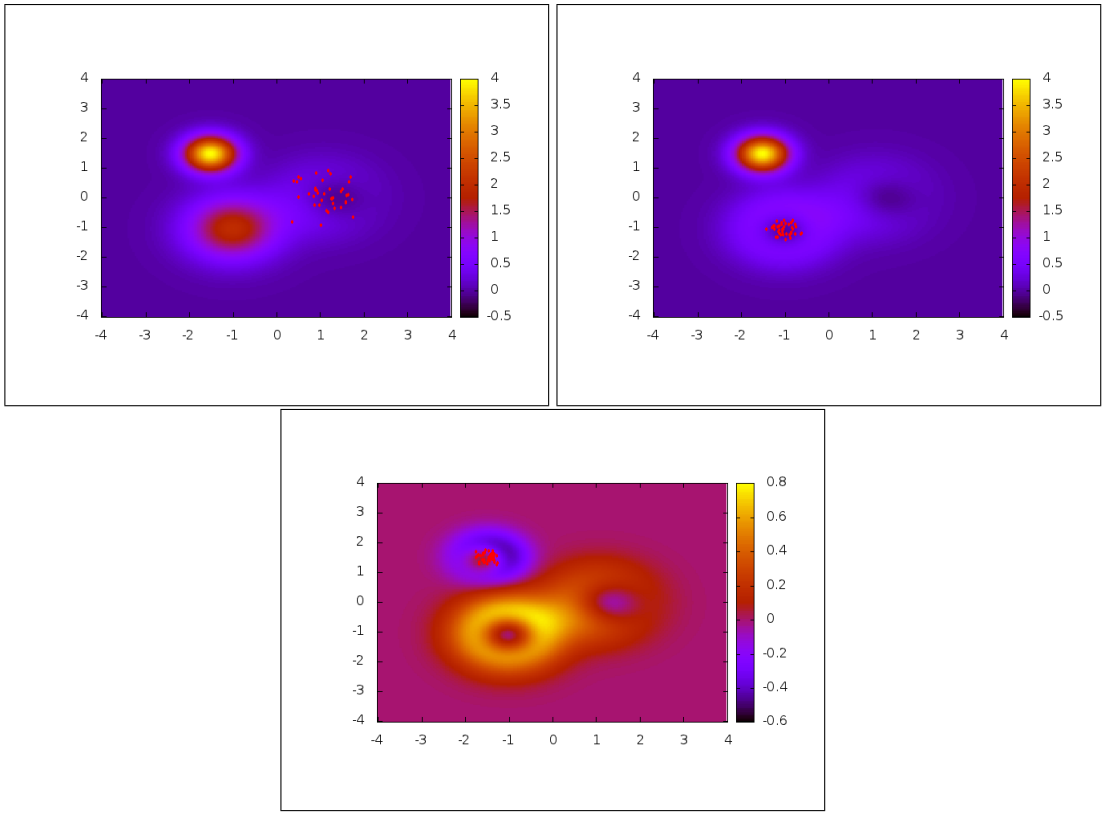

Figure 1.2: Clusters returned in subsequent interations of sequential niching algorithm applied for function $f(X) = 2e^{-((x+1.1)^2+(y+1.1)^2)} + 1.5e^{-((x-1)^2+y^2)} + 4e^{-3((x+1.5)^2+(y-1.5)^2)}$. The resulted fitness function is visualized as a color map (*pm3d*)

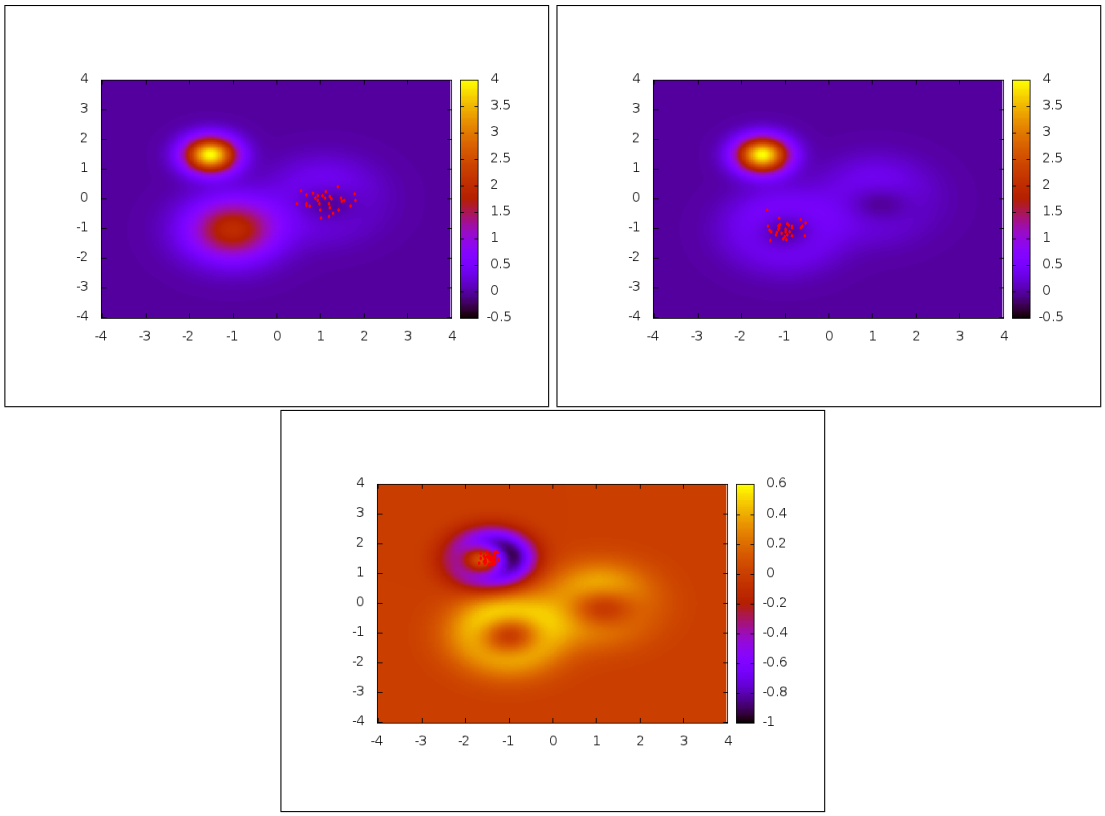

Figure 1.3: Visualization of the fitness deterioration outcomes in subsequent iterations. Test function: $f(X) = 2e^{-((x+1.1)^2+(y+1.1)^2)} + 1.5e^{-((x-1)^2+y^2)} + 4e^{-3((x+1.5)^2+(y-1.5)^2)}$. Deterioration algorithm: *Basic scheme*