

1 Theory

1.1 Basic Components

The following are the most basic components that are present in most genetic algorithms:

1. Fitness function for optimization.
2. Population of chromosomes.
3. Selection of chromosomes for reproduction.
4. Crossover to produce the following generation of chromosomes.
5. Random mutation of chromosomes in the following generation.

1.1.1 Fitness Function

Fitness is a term from biology which defines the extent to which a certain type of organism is able to pass itself onto the next generation, based on the way a given organism does its job. It can be stated with the following question: which survival form will pass the most copies of itself onto the next generation?

In the context of genetic algorithms, fitness ...

1.1.2 Chromosomes

Usually, a genetic problem is designed to solve a certain problem. Chromosomes can thus be described as the values an individual unit contains, that are used to solve that particular problem. For each individual unit, their corresponding chromosomes are defined in an array that contains parameters. The representation of the values that the parameters define is dependent on the problem that the creator is trying to solve. A chromosome can be defined as following:

$$\text{chromosome} = [p_1 \dots p_N]$$

Where N is the number of dimensions of the problem and p corresponds to the given parameters. p can be expressed in, for example, binary, real numbers and so forth.

1.1.3 Selection Operator

2 Bibliography

Carr, J. (2014). An Introduction to Genetic Algorithms.

<https://www.whitman.edu/Documents/Academics/Mathematics/2014/carrjk.pdf>