The Effectiveness of Genetic Algorithm in Solving Simultaneous Equations

Abstract

There are several known conventional algorithms for solving system of linear equations, which are based on some theoretical principles. Finding solution to these set of equations through the evolutionary process of genetic algorithm is a new and developing research area of interest. The Genetic Algorithm approach follows the concept of solution evolution by stochastically
developing generations of solutions population using a definite fitness function to determine the
best fit solution to the problem. In this study, we experimented with a new non-conventional
approach, based on biological evolution, to solving system of simultaneous linear equations. We
discussed the origin of Genetic Algorithm and explore its applicability in solving system of
simultaneous equations. We used Genetic Algorithm, on one hand, and Gaussian elimination
method, on the other hand, to solve seven different systems of simultaneous linear equations.
We then compared the results obtained from the two methods. It was observed that the
Genetic Algorithm was very effective in discovering all possible sets of solutions that are
applicable to any given system of simultaneous linear equations. Conventional numerical
methods, such as Gaussian elimination method, produced a single set of solutions for a
particular system of simultaneous linear equations, but GA was able to produce more than one
set of solutions for certain systems of equations. For example, during our experiments with GA
equation solver, one particular set of equations produced three different sets of perfect
solutions, which perfectly fit into the equations.

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Index Terms

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Key words

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