Implementation of Fractional Electromagnetic Potential Through a Genetic Algorithm

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June 16, 2008

Abstract

The Maxwell equations play a fundamental role in the well established formulation of the electromagnetic theory. In fact, these equations expressing the basic laws of electricity and magnetism, but only involve the integer-order calculus and, therefore, it is natural that the resulting classical models adopted in electrical engineering reflect this perspective. Recently, a closer look for the electrical phenomena motivated a new perspective towards the replacement of classical models by fractional-order mathematical descriptions. Bearing these ideas in mind, in this study we apply the classical expressions for the static electric potential under the viewpoint of the fractional calculus. The fractional-order electrical potential approximation is implemented through a genetic algorithm, that is a search technique used to find approximate solutions in optimization problems.

Keywords: Fractional calculus; Electric potential; Genetic Algorithms;

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