"Digital Filters Design Educational Software Based on Immune, Genetic and Quasi-Newton Line Search Algorithms"

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Abstract:

This paper presents educational software developed for designing FIR and IIR digital filters using two evolutionary algorithms (EAs); namely immune algorithms (IAs) and genetic algorithms (GAs), together with quasi-Newton line search algorithm (QNLS). This software provides the user the ability to design one- and two-dimensional; low-pass, high-pass, band-pass and band-stop digital filters with arbitrary magnitude and group delay specifications. The software is evaluated by making the assessment quizzes for electrical engineering students and instructors. Students’ responses are very positive. A number of recommendations are made in this work based on instructor observation and students’ evaluations.

Keywords:

digital filters; evolutionary algorithms; EAs; immune algorithm; IAs; genetic algorithm; GAs; quasi-Newton line search algorithm; QNLS; blending teaching and learning.

Published In:

Int. J. of Innovation and Learning, Vol. 9 - No. 1, pp. 35-62