

## ABSTRACT

This work uses a genetic algorithm (GA) in the design of finite impulse response (FIR) filters with quantized coefficients represented in the signed-power-of-two (SPT) format. FIR filters presents linear phase and for that reason this type of filter is chosen when an application demands constant group delay. The SPT numbers, which are easy to implement into hardware, were discussed and a comparison between its minimal and canonical forms was made aiming at the potential reduction of arithmetical operations and the possibilities each one offered for number representation. The GA searches for the optimum filter coefficients that produce a filter according to its project specifications. Many analysis were made on the effects of changes made to the GA's parameters like selection intensity, population size, mutation, crossover among others. A new crossover operator was proposed, in which the filter's coefficients are repositioned produced a good results in filter optimization. The algorithm was implemented in the design of low-pass, high-pass, band-pass and band-stop filters.

Keywords: Genetic algorithms. Signed-power-of-two. FIR filters.