

Design and Comparative Study of Digital FIR Filters using Improved Particle Swarm Optimization

Nidhi Mishra
M. Tech Scholar
Digital Electronics Department
Chouksey Engineering College, Bilaspur, Chattisgarh
(India)
nidhichouksey11@gmail.com

Nitin Jain
Assistant Professor
Digital Electronics Department
Chouksey Engineering College, Bilaspur, Chattisgarh
(India)
ernitin_jain@rediffmail.com

Abstract – In order to reduce the effect of Inter Symbol Interference (ISI) in a digital communication system, different types of transmitting pulse shaping filters have been extensively used in practice. We need to design these filters with some constraints imposed by requirements of the communication system in which we are going to use them. The use of optimization techniques have been proved to be quite useful towards the design of those digital filters with certain specifications. This paper proposes a framework for designing; Low Pass, High Pass, Band Pass and Band-Stop filters, using Improved Particle Swarm Optimization (IPSO). IPSO is an improved PSO that proposes a new definition for the velocity vector and swarm updating and hence the solution quality is improved. In the design process, the filter length, pass band and stop band frequencies, feasible pass band and stop band ripple sizes are specified. The performance of the proposed filter has been examined by recording the variation of the resulting frequency response with number of iteration and population size.

Keywords– Inter Symbol Interference, Improved Particle Swarm Optimization, Low Pass, High Pass, Band Pass and Band-Stop Filters.