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# Hardware Efficient FIR Filter Design using Global Best Steered Quantum Inspired Cuckoo Search Algorithm

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## Highlights

- Optimized sets of coefficients for implementing different order FIR Filters are obtained using Global Best Steered Quantum inspired Cuckoo Search algorithm (GQICSA) and Quantum inspired Cuckoo Search algorithm (QICSA).
- Mean Square Error based function is used as the objective function.
- Adder costs for the filters are estimated after quantizing the coefficients.
- In an analysis performance of GQICSA is compared to other algorithms for optimizing filter coefficients to design lower hardware costing filters without compromising filter responses.
- Efficiency of GQICSA and QICSA over Cuckoo Search algorithm is proved with 16 standard benchmark functions.

## Abstract

In this paper, a new algorithm namely *Global Best Steered Quantum Inspired Cuckoo Search Algorithm* (GQICSA) is proposed for obtaining optimized set of coefficients to implement Finite Impulse Response (FIR) Filter. Adder cost of a filter is estimated after quantizing the filter coefficients followed by Common Sub-expression Elimination (CSE). We found from the simulation results that reduction in word length of coefficients does not make the filters fail to achieve the ideal frequency response. Moreover, filters developed using GQICSA outperform the benchmark

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