Abstract

The scientific community is still interested in heuristic techniques and optimization algorithms that could be applied in complex problems such as the antenna adaptive beam forming problem. This paper presents an empirical study of solving the problem of antenna adaptive beam forming using Central Force Optimization (CFO) algorithm. The algorithm implemented using Compute Unified Device Architecture (CUDA) then applied on a graphics processing unit (GPU). CFO is well known alternatives for global optimization based on a nature-inspired Heuristic. Extensive experimentations were applied to compare their performance through a number of case studies. CFO has a higher computational complexity but it gives good results. The experimentations showed that the resulting beam-pattern optimized by the CFO required a large processing time which is not acceptable for an on line applications. Hence, the demand
for a parallel solution that accelerates these computations is considered. Therefore, a parallel version of CFO is proposed and implemented using (CUDA) then applied on a (GPU). The comparison is presented to show how the parallel version of the CFO outperforms the sequential one, thus an online procedure is available for time-critical applications of the adaptive beam-forming.

References


Index Terms

Computer Science

Applied Sciences

Keywords

CFO, global optimization algorithm, evolutionary algorithm, CUDA, GPU