

Seminar

Institute for Plasma Research

Title : Investigation of Particle swarm optimization for multidisciplinary problems

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Date : 09th August 2017 (Wednesday)

Time : 03.30 PM

Venue : Seminar Hall, IPR

Abstract :

Nature inspired techniques deals with the solution of a complex systems using innovative use of phenomenons existing in the nature. Particle Swarm Optimization (PSO) is a technique inspired by the collective behavior found in the Swarms such as bird flocking, fish schooling etc. PSO is based on the concept of creation of particles (candidate solutions) and moving them in the search space guided by (a) information exchange within the group and (b) self best performance. During movement, the particles organize themselves and move towards a better solution in search space. PSO is useful when the gradient is too laborious or even impossible to calculate. It can also be applied to the non-continuous and nondifferentiable problems. The meta optimization of PSO is an active area of research. A PSO code has been developed and validated against standard multi-parameter benchmark functions. The algorithm is then applied to a range of physical problems from different domains and its efficacy under different conditions has been studied. The problems investigated are optimization of electromagnetic coilgun geometry, fracture model parameters, reactive force field potential parameters. This work also present the modification of the PSO technique for solving problems which require evolution of the search space. In summary, it has been demonstrated that the PSO is an efficient technique for complex multidisciplinary problems. However, meta optimization of algorithmic parameters and search space optimization provides better results.
