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International Journal of Computer Applications  
© 2010 by IJCA Journal

Number 10 - Article 5

Year of Publication: 2010

Authors:

M. Pourmahmood Aghababa

A.M. Shotorbani

R. M. Shotorbani

10.5120/1618-2176

{bibtex}pxc3872176.bib{/bibtex}

**Abstract**

This paper describes an improved version of particle swarm optimization (PSO) method, called adaptive particle swarm optimization (APSO), for solving engineering optimization problems especially in power system fields. This algorithm uses a novel PSO algorithm to increase convergence rate and avoid being trapped in local optimum. The APSO algorithm efficiency is verified using some benchmark functions. Numerical simulation results demonstrate that the APSO is fast and has much less computational cost. Then, the proposed APSO method is used for determining the parameters of the optimal proportional-integral-derivative (PID) controller for an AVR power system. The proposed approach has superior features including easy implementation, stable and fast convergence characteristics and good computational efficiency. Also, the proposed method is indeed more efficient and robust in improving the step response of the AVR system.

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### **Index Terms**

Computer Science

Power Systems

### **Key words**

Optimum Particle Swarm Optimization

Fast Convergence

Local

PID Controller

AVR Power System