

## Effect of Acceleration Coefficient on Particle Swarm optimization for Task Scheduling in Cloud Computing

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### Abstract

Cloud computing emerges as a powerful platform to deliver IT services online. Due to the rapid development of cloud computing the user's dependence on the cloud has increased and hence user request per unit time is increases. Now scheduling and serving the user requests is a major challenge. Particle swarm optimization as a heuristic algorithm is the most suitable algorithm in such scenario to serve user requests for the most appropriate resources. Author written this research paper in continuation with previous research paper called Modified particle swarm optimization (MPSO) in which author controlled the inertia weight in PSO to find the best cost. This research paper investigates the effect of acceleration coefficient to achieve the best cost. The implementation results of PSO with different acceleration coefficient are produced and compared. Author has use MATLAB to test the effect of acceleration coefficient on fitness value and also implemented in CloudSim simulator to test variation in execution time in various scenario. The purpose of author is also to test correctness of Reyes-Sierra and Coello [19] suggested acceleration coefficient.

**Keywords:** Particle Swarm Optimization (PSO), Modified Particle Swarm Optimization (MPSO), Inertia Weight, Acceleration coefficient.

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### 1. Introduction

Cloud computing is a model that enables convenient, on demand network access which is required for a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be quickly provisioned and deployed with minimal management effort or service provider interaction [2]. It is a new computing system that uses geographically shared computer resources, and is available to users with a variety of online services with minimal management effort [1]. Task scheduling is a major challenges related to accessing appropriate resources in the cloud to increase costs under a variety of factors [4].

Task scheduling refers to scheduling of task to appropriate resources to optimize computing costs. The computing performance depends on proper scheduling of task to the appropriate resources. Existing algorithms are

using parameters such as time, makepan, speed, cost, setting the success rate, resource usage and so on. [1,5, 6, 7, 9, 10, 11]. Other parameters such as availability and reliability can play an important role and can be considered [4]. Since task scheduling is a complex problem, so a heuristic algorithm will be more suitable. The PSO heuristic algorithm has already been used to solve the scheduling problem [2,13,14,16,17]. The main objective of this research paper is to test correctness of acceleration coefficient suggested by Reyes-Sierra and Coello [19] and to find suitable parameter of PSO to improve the performance of the task scheduling to achieve better costs. This paper is written in continuation with research paper [16,25].

This research paper is structured as follows: a review of previous work is described in section 2. Section 3 contains details about the proposed algorithm. Section 4 describes the test setup, the implementation of the MPSO







