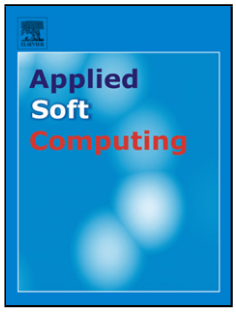

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Teaching-learning-based optimization with learning experience of other learners and its application

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Abstract: To improve the global performance of the standard teaching-learning-based optimization (TLBO) algorithm, an improved TLBO algorithm (LETLBO) with learning experience of other learners is proposed in the paper. In LETLBO, two random possibilities are used to determine the learning methods of learners in different phases. In the Teacher Phase, the learners improve their grades by utilizing the mean information of the class and the learning experience of other learners according to a random probability. In Learner Phase, the learner learns knowledge from another learner which is randomly selected from the whole class or the mutual learning experience of two randomly selected learners according to a random probability. Moreover, area copying operator which is used in Producer-Scrounger model is used for parts of learners to increase its learning speed. The feasibility and effectiveness of the proposed algorithm are tested on 18 benchmark functions and two practical optimization problems. The merits of the improved method are compared with those of some other evolutionary algorithms (EAs), the results show that the proposed algorithm is an effective method for global optimization problems.

Keywords: Teaching-learning-base optimization (TLBO), Global optimization, Learning information, Evolutionary algorithms (EAs)

1 Introduction

In the real world, with the rapid development of technology and science, more and more engineering problems can be modeled as seriously optimization problems. The early works mainly focus on various mathematical techniques, but these methods may not be used efficiently for finding global optima. On the other hand, many intelligent optimization techniques have been developed by mimicking natural phenomena and widely applied as an alternative to traditional techniques in various fields of science. These intelligent optimization techniques have shown promising results for solving complex engineering problems such as structural design [1-5], multi-pass turning operations [6-8] and milling operations [9-10] of