Optimum allocation of Iranian oil and gas resources using multi-objective linear programming and particle swarm optimization in resistive economy conditions

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Abstract

This research presents a model for optimal allocation of Iranian oil and gas resources in sanction condition based on stochastic linear multi-objective programming. The general policies of the resistive economy include expanding exports of gas, electricity, petrochemical and petroleum products, expanding the strategic oil and gas reserves, increasing added value through completing the petroleum value chain and decreasing crude oil and gas sale. The proposed mathematical model includes three objective functions: minimizing imports of petrochemical products and crude oil sale, maximizing economic benefits, and minimizing the environmental pollutions. The model includes constraints of gas, oil, and electricity flow balance and also supply and demand capacity constraints. A Pareto-archive-based particle swarm algorithm was used to solve the model. The results of proposed algorithm were compared with NSGA-IIresults. The comparison showed the proposed algorithm is more accurate in solving of the energy resource allocation model in 2016-2031 timespan. The results of this study can present helpful solutions to oil and gas resource allocation planning in Iran. The main contribution of this paper is proposing a new stochastic linear multi-objective programming with considering the general policies of resistive economy and solving the model with a new Pareto-archive-based particle swarm algorithm.

Keywords

Oil and Gas Resource Allocation; Stochastic Linear Multi-Objective Programming; Economic Sanction; Resistive Economy; Particle Swarm Optimization

Main Subjects

Metaheaurestic Techniques; Optimization Techniques

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