عنوان مقاله:

Two metaheuristic algorithms for Direct Aperture Optimization in Intensity Modulated Radiation Therapy: real-world case study for liver cancer

محل انتشار:

هجدهمین کنفرانس بین المللی مهندسی صنایع (سال: 1400)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Integrated treatment plan design for cancer patients has high importance in intensity modulated radiation therapy (IMRT). Direct aperture optimization (DAO) is one of the efficient approaches used in recent years to attain this goal. Considering a set of beam directions, DAO is an integrated approach to optimize the intensity and leaf position of apertures in each direction. In this paper, first, a mixed integer-nonlinear mathematical formulation for the DAO problem in IMRT treatment planning is presented. Regarding the complexity of the problem, two wellknown metaheuristic algorithms, differential evolution (DE) and particle swarm optimization (PSO), are utilized to solve the model. The parameter calibration is performed with the Taguchi method for both algorithms. The performance of algorithms is evaluated by solving the model for ۱۰ real liver cancer cases. The analysis of results demonstrates that the PSO algorithm outperforms the DE algorithm. Some directions are discussed for future researches.

کلمات کلیدی:

Radiation therapy treatment planning, Intensity modulated radiation therapy, Direct aperture optimization, Particle swarm optimization, Differential evolution,

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