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Modified particle swarm optimization for optimum design of spread footing and retaining wall. (English) [Zbl 1400.74091](#)
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Summary: This paper deals with the economically optimized design and sensitivity of two of the most widely used systems in geotechnical engineering: spread footing and retaining wall. Several recent advanced optimization methods have been developed, but very few of these methods have been applied to geotechnical problems. The current research develops a modified particle swarm optimization (MPSO) approach to obtain the optimum design of spread footing and retaining wall. The algorithm handles the problem-specific constraints using a penalty function approach. The optimization procedure controls all geotechnical and structural design constraints while reducing the overall cost of the structures. To verify the effectiveness and robustness of the proposed algorithm, three case studies of spread footing and retaining wall are illustrated. Comparison of the results of the present method, standard PSO, and other selected methods employed in previous studies shows the reliability and accuracy of the algorithm. Moreover, the parametric performance is investigated in order to examine the effect of relevant variables on the optimum design of the footing and the retaining structure utilizing the proposed method.

MSC:

- [74P10](#) Optimization of other properties in solid mechanics
- [90C15](#) Stochastic programming
- [90C59](#) Approximation methods and heuristics in mathematical programming

Keywords:

particle swarm optimization (PSO); spread footing; retaining wall; sensitivity analysis

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