نویسندگان:
R. Deepika
C.R. Suribabu

خلاصه مقاله:

The shape optimization of gravity dam is posed as an optimization problem with goals of minimum value of concrete, stresses and maximum safety against overturning and sliding need to be achieved. Optimally designed structure generally saves large investments especially for a large structure. The size of hydraulic structures is usually huge and thus requires a huge investment. If the optimization techniques are employed in the design stage, the project investment can be effectively minimized. There are many optimization techniques were used to optimize the gravity dam. In the present work, optimization of gravity dam is carried out using the differential evolution technique. Differential evolution is an evolutionary algorithm which process iteratively to locate best solution in the large search space. Searching of optimal solution to a problem is carried out by the process of mutation, cross over and reproduction from the initial developed candidate solutions. After undergoing a number of iterations, it is possible to get the minimum cross sectional area of dam which can satisfy various constraints and thus the reduction in volume of concrete can be achieved. From the results obtained, it is found that differential evolution is one of the efficient techniques for solving such a problem over continuous space. The success of differential evolution in solving a specific problem critically depends on appropriately choosing trial vector generation strategies and their associated control parameter value. The optimum solution obtained is compared with analytical method and it is found that there is ۲۰.۴۴ % of reduction in the requirement of concrete is envisaged.

کلمات کلیدی:

optimization, gravity dam, differential evolution algorithm

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