

基于改进遗传算法的拱坝位移反分析

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摘要 利用遗传算法对拱坝地质力学参数位移反分析的方法进行了研究。针对简单遗传算法的早熟现象, 引入了小生境技术与自适应杂交变异概率的方法, 并结合拱坝地质力学模型试验与三维有限元方法, 给出了适合推求拱坝地质力学参数的反分析方法。结合实际工程, 反演了拱坝基岩的弹性模量和泊松比。结果表明, 该算法适用于拱坝地质力学参数的位移反分析, 可以有效地解决简单遗传算法的早熟现象, 而且收敛效率也有明显提高。

关键词 [水利工程](#); [拱坝](#); [位移反分析](#); [遗传算法](#); [小生境](#); [自适应概率](#)

分类号

DISPLACEMENT BACK ANALYSIS OF ARCH DAMS BASED ON IMPROVED GENETIC ALGORITHM

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Abstract

The improved genetic algorithm is proposed to identify the elastic constants of rock foundation of concrete arch dams according to the measured displacements. Considering the premature phases of genetic algorithms, niche technology and method of adaptive probabilities of crossover and mutation are both introduced into the classical simple genetic algorithm to carry out the displacement back analysis which is based on the displacements measured in the model experiments and 3D FEM. In a case study on the practical engineering, the elastic modulus and Poisson's ratio are obtained. The study shows that this method is suitable for the displacement back analysis of arch dams. It can also avoid premature phases that often happen in simple genetic algorithms, and a good convergence is achieved.

Key words [hydraulic engineering](#); [arch dam](#); [displacement back analysis](#); [genetic algorithm](#); [niche](#); [adaptive probabilities](#)

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