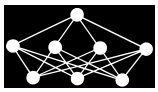

PREDICTION OF SLOPE STABILITY BASED ON GA-BP HYBRID ALGORITHM

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Abstract: Safety monitoring and stability analysis of high slopes are important for high dam construction in mountainous regions or precipitous gorges. Slope stability estimation is an engineering problem that involves several parameters. To address these problems, a hybrid model based on the combination of Genetic algorithm (GA) and Back-propagation Artificial Neural Network (BP-ANN) is proposed in this study to improve the forecasting performance. GA was employed in selecting the best BP-ANN parameters to enhance the forecasting accuracy. Several important parameters, including the slope geological conditions, location of instruments, space and time conditions before and after measuring, were used as the input parameters, while the slope displacement was the output parameter. The results shown that the GA-BP model is a powerful computational tool that can be used to predict the slope stability.

Key words: *GA-BP hybrid algorithm, Jinping I hydropower station, left abutment slope, stability*

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1. Introduction

The accurate estimation of the stability of a rock or soil slope is a difficult problem mainly because of the complexity of the physical system itself and the difficulty involved in determining the necessary input data associated with geotechnical parameters [8]. The methods most commonly used at present for slope stability analysis are the rigid-body limit equilibrium method and the finite element method (FEM) [6]. The former yields a safety factor determined by analyzing the limit equilibrium status of a block. The method is characterized by clear concepts and simple calculations. However, it cannot take nonlinear structural deformation into account, and the method assumes that sliding surfaces reach an ultimate state of failure simultaneously, which does not reflect the actual stress status of slip surfaces

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