

论文

基于粒子群优化BP神经网络的巷道位移反分析

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摘要:

以某煤矿资料为基础, 确定出岩体物理力学参数水平, 并设计正交试验表。根据巷道边界条件建立几何模型, 通过有限元法计算得出的位移值建立起PSO-BP神经网络学习样本, 从而得到矿山巷道位移反分析预测岩体物理力学参数模型。研究表明: 实测位移量与由预测参数计算位移量间的最大误差为3.27%, 通过实测位移值反分析求得的岩体物理力学参数值可信, PSO-BP神经网络应用于矿山巷道位移反分析是可行的。

关键词: 巷道位移; 物理力学参数; 反分析法; PSO算法; BP神经网络

Roadway displacement back analysis based on BP neural network optimized by particle swarm

Abstract:

Combined with the example of a coal mine, parameter level of physical and mechanical of rock mass in parameter selection scope was obtained, designed orthogonal test table on this basis. Geometric model was based on roadway boundary conditions, then got the displacement to establish PSO-BP neural network relevant study sample through finite element method, back analysis of displacement for prediction on rock physical and mechanical parameters model was obtained. The calculated result shows that the maximum error between the measured value and calculated displacement value by forecasting parameters is 3.27%. It is credible that physical and mechanical parameters can be obtained by means of inverse seeking displacement, so it appears that the PSO-BP network is feasible in mine roadway displacement back analysis.

Keywords: roadway displacement; physical and mechanical parameters; back analysis method; PSO algorithm; BP neural network

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