

工程与应用

SVM在成矿预测中的研究

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摘要 传统成矿预测多以某种统计假设为前提,而在实际应用中往往找不到完全符合这样的地质事件。因此将非线性科学与矿产资源预测相结合是未来矿产资源预测的发展方向。人工神经网络(ANN)在进行预测时能够在输出和输入之间建立一个非线性映射关系,具有容错性好、自学习、自适应性强等特征,但存在收敛速度慢、易陷入局部最优、网络结构不确定以及不能解决VC维等问题。SVM具有严格的泛化性理论指导和核函数强大的非线性映射能力,并且SVM不存在局部极小,维数灾难问题等。为此提出了基于SVM的成矿预测方法,将SVM应用于矿产资源的预测中,并对BP神经网络、RBF神经网络预测方法比较分析。实验结果表明,SVM预测方法优于BP神经网络方法和RBF神经网络,更加接近预测元素的实际值。

关键词 [人工神经网络](#) [矿产资源预测](#) [支持向量机](#) [核函数](#)

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SVM in research of mine forecast

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Abstract

Traditional mineral forecasting models are more by a certain statistics supposition for premise, but such as supposition event in practical application totally doesn't exist. So nonlinear science with mineral resources forecasted unified is the developing direction. Artificial Nerve Network (ANN) can establish a non-linear reflection relation between the input and output, has good fault-tolerant, self-learning and adaptability ect. But it has a slow convergence, a local optimum, the uncertainty network structure and can not resolve the VC issues ect. SVM has the strict guidance of general theory, the powerful mapping capabilities of nuclear non-linear function and many advantages which ANN has not, such as no local minimum and problem of dimension. Based on this, this paper proposes SVM mineral forecasting methods, applying SVM to the mineral resources forecast, and compares and analyzes SVM, BP and RBF forecasting methods. The results show that SVM has a better ability to learn and generalize and has made good results in the prediction of mineralization and has a better performance in predictable performance than the traditional neural network and are close to the actual value.

Key words [Artificial Nerve Network \(ANN\)](#) [mineral forecasted model](#) [Support Vector Machine \(SVM\)](#) [kernel function](#)

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