

人工智能

自适应变系数粒子群—径向基神经网络模型在负荷预测中的应用

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**摘要:** 为了提高短期电力负荷预测精度,提出了一种自适应变系数粒子群—径向基函数神经网络混合优化算法(AVCPSO-RBF)。实现了径向基神经网络参数优化。建立了基于该优化算法的短期负荷预测模型,利用贵州电网历史数据进行短期负荷预测。仿真表明,该方法的收敛速度和预测精度优于传统径向基神经网络方法和粒子群—RBF神经网络方法及基于混沌理论的神经网络模型,该优化算法克服了径向基神经网络和传统的粒子群优化方法的缺点,改善了径向基神经网络的泛化能力,提高了贵州电网短期负荷预测的精度,各日预测负荷的平均百分比误差可控制在1.7%以内。该算法可有效用于电力系统的短期负荷预测。

**关键词:** 短期负荷预测 自适应变系数粒子群 泛化能力 径向基神经网络 short-term load forecasting Adaptive Variable Coefficients Particle Swarm Optimization (AVCPSO) generalization ability Radial Basis Function (RBF) neural network

Short-term load forecasting method based on neural network hybrid algorithm of adaptive variable coefficients particle swarm optimization and radial basis function

**Abstract:** To improve short-term load forecasting accuracy, a neural networks hybrid optimization algorithm of Adaptive Variable Coefficients Particle Swarm Optimization and Radial Basis Function (AVCPSO-RBF) was proposed. The RBF neural network parameters could be optimized. The short-term load forecast model was established based on the AVCPSO-RBF algorithm. Using the method and history load data of Guizhou power system, the short-term load forecasting was carried out. The experimental results show that convergence of the method is faster and forecast accuracy is more accurate than that of the traditional RBF neural network algorithm, the PSO and RBF neural networks algorithm and the neural networks model based on chaos theory. The hybrid algorithm improves the RBF neural network generalization capacity, and overcomes the shortcomings of the traditional PSO algorithm and the RBF neural networks. The short-term load-forecasting accuracy is improved in Guizhou power system, of which the average percentage error is no more than 1.7%. The hybrid algorithm can be effectively used in short time load forecasting of the power system.

Keywords:

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