

军用系统分析

地面站数传系统的RBFNN模型及算法

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摘要:

针对难以建立精确数学模型的地面站数传系统, 提出改进梯度迭代的径向基神经网络建模方法。改进梯度学习算法通过训练样本相关性矩阵的主成分分析确定网络隐含层初始节点数; 改进迭代过程中网络参数的梯度信息计算方式, 加快了迭代收敛速度; 并增加结构调整过程, 实现对网络规模的精简。通过采集地面站数传系统输入-输出数据, 将改进梯度学习算法应用于网络离线训练, 并给出具体实现步骤。地面站数传资源配置优化实例验证了模型具有较高泛化能力, 且算法稳定性较佳。

关键词: 地面站 数传系统 径向基神经网络 改进梯度学习

Modeling and algorithm of data transmission system of ground station based on radial basis function neural network

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Abstract:

To study the data transmission system of a ground station which is difficult to describe with a precise mathematical model, a radial basis function neural network modeling method with advanced gradient learning algorithm is proposed. Principal component analysis is used to determine the initial node number of hidden units. The method to compute the gradient information of network parameters is improved to accelerate convergence. The structure adjusting process is added to simplify the scale of networks. The algorithm is employed to the offline training of model parameters by sampling the input/output data of the system, and the realization details are also provided. Experiment results show that the model possesses a higher performance of generalization, and the advanced gradient learning algorithm has a better stability.

Keywords: ground station data transporting system radial basis function neural network (RBFNN) advanced gradient learning

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