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# 采用中心聚类与PSO的RBF网络设计方法

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摘要 基于中心聚类法与微粒群（PSO）优化方法，提出一种径向基函数（RBF）网络的设计算法。算法采用中心聚类方法对输入样本数据进行聚类处理，自适应地确定RBF网络隐含层的初始参数；利用修正全局最优解计算方法的经典PSO算法优化RBF网络隐含层参数，进一步修正网络结构参数；输出层权值采用带遗忘因子的递推最小二乘算法在线更新。采用该方法建立炼铁过程中烧结矿成分与转鼓强度关系的预测模型，并用现场数据加以验证；实验结果表明该方法收敛速度快，所建立的模型具有较高的预测精度，可用于复杂非线性系统建模。

关键词 中心聚类 微粒群优化 径向基函数 递推最小二乘 转鼓强度

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# RBF design method based on center clustering and PSO

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**Abstract**

An algorithm for designing Radial Basis Function Neural Network based on center clustering and modified particle swarm optimization algorithm is introduced.Center clustering algorithm is proposed to process the input sample，and adaptively specify the hidden layer parameters of RBF neural network；classic PSO algorithm（Particle Swarm Optimization） with modified calculation method about globally optimal solution is used to train the parameters，and makes them tend to global optima；the output layer weights are updated on line by recursive least square algorithm with forgetting factor.At last，the hybrid algorithm is applied to design the prediction model about relationship between the sinter composition and drum strength.Then experiment validates the model with new data which are collected from sinter workshop.Experimental results show that the hybrid algorithm has high convergence speed，and model built by that has great prediction precision.

**Key words** center clustering Particle Swarm Optimization（PSO） Radial Basis Function（RBF） recursive least square drum strength

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