

基于改进BP神经网络的复合叶轮离心泵性能预测 Performance Predicting of Centrifugal Pumps with Compound Impeller Based on Improved BP Neural Network

袁寿其 沈艳宁 张金凤 袁建平

江苏大学

关键词: 复合叶轮 BP神经网络 性能预测

摘要: 应用Matlab建立了复合叶轮离心泵效率和扬程的BP神经网络预测模型。选取73组试验结果作为样本, 采用Levenberg-Marquardt法则对构建的网络进行训练, 并随机选取12组训练样本外的数据对训练好的网络进行测试。试验的主要参数为流量 Q , 叶片数 z , 叶片出口安放角 β_2 , 短叶片进口直径 D_i , 叶片出口宽度 b_2 , 效率 η 以及扬程 H 。其中选取 Q , z , β_2 , D_i , b_2 作为网络的输入层, η 和 H 作为输出层。预测结果的分析表明, 预测值与试验值具有较好的一致性, 利用BP神经网络对复合叶轮离心泵性能进行预测是可行的, 可用来作复合叶轮的辅助设计, 从而缩短试验时间, 降低成本。 Based on Matlab, BP neural network model for efficiency and head of centrifugal pumps with compound impeller predicting was established. Seventy-three groups of experimental data were selected as samples for BP neural network training with Levenberg-Marquardt law. Then twelve experimental data extra was random selecting to test the trained BP neural network. The main parameters for experimentation are flow rate Q , the number of blade z , outlet angle of blade β_2 , inlet diameter of splitter blade D_i , outlet width of impeller b_2 , efficiency η and head H . Select Q , z , β_2 , D_i , b_2 as input layer, η and H as output layer. The results show the predicted value favourably accorded with experiment. So it is possible to use BP neural network for predicting performance of centrifugal pumps with compound impeller. BP neural network can be applied to compound impeller designing, which can shorten experimental time and reduce cost.

[查看全文 \(请使用Adobe Acrobat 6.0版本浏览\)](#) [返回首页](#)

[引用本文](#)