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论文

低比转速离心泵叶轮几何参数多目标优化

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摘要：

低比转速离心泵的效率与泵的损失、汽蚀余量和扬程曲线的稳定性有关.以能量损失最小、汽蚀余量最小及消除驼峰为目标,采用线性加权组合的方法,建立低比转速泵叶轮几何参数的多目标优化函数,并应用超传递近似法进行多目标优化.实例优化证明,采用该方法,设计者可根据实际经验对各目标函数的重要性进行模糊评价,合理确定各目标的权值,对泵的效率、汽蚀和稳定性等性能进行设计优化,以得到更为科学的设计方案.

关键词： 多目标优化;超传递近似;离心泵;叶轮

Multi-objective optimization for the geometrical parameters of the low-specific-speed centrifugal impeller

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Abstract:

The efficiency of a low specific speed centrifugal pump is concerned with the loss, the NPSH r and the stability of the head curve. The multi objective optimization function of the geometry parameter of impeller in a low specific speed centrifugal pump was found by the linear weighted combinations method with the arm of the least of the energy loss and the NPSH r and the elimination of the hump. The optimizations of the example proved that the designers can fuzzy evaluate the importance of the target functions with this method by fact experience and confirm the weight of the targets. The efficiency, NPSH r and stability of the pump can be optimized to get further scientific project in design.

Keywords: multi-objective optimization; super-transitive approximate; centrifugal pump; impeller

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