

基于遗传算法的压缩机参数优化Parameter Optimization of Compressor Based on Genetic Algorithm

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摘要: 为了提高直流无刷电动机驱动压缩机的效率, 提出嵌入电动机模块的遗传算法的压缩机优化方法。模型优化目标为电动机效率, 优化变量为低压缸直径、高压缸直径、低压活塞行程、高压活塞行程、电动机转速。产生的变量值通过sim函数赋值给电动机模块, 通过sim函数控制电动机模块的仿真时间, 仿真结束后, 将效率值通过sim函数返回给遗传算法主程序。仿真结果表明, 优化后的压缩机效率比优化前更优。实验结果表明, 优化后压缩机在低压0.7MPa时比功率和优化前相差很小, 在高压2.5MPa时明显小于优化前的比功率, 说明嵌入电动机模块的遗传算法的压缩机优化方法是可行、合理的。In order to improve the efficiency of permanent magnet brushless D.C. motor (BLDCM) driving air compressor, genetic algorithm embed BLDCM module which optimizes the air compressor was put forward. Optimized target of genetic algorithm is the efficiency of BLDCM. Optimized variables are the diameter of low pressure cylinder, the diameter of high pressure cylinder, the journey of low pressure piston, the journey of high pressure piston and the rotate speed of BLDCM. The values of variables were passed to BLDCM module by sim function. Simulation time was controlled by sim function. The efficiency value was passed to genetic algorithm program. Simulated result shows that the efficiency of BLDCM is higher than that before optimized. The experimental result shows that the specific power of air compressor is almost the same as that before optimized at 0.7MPa, but is much less than that before optimized at 2.5MPa. The result also shows that genetic algorithm embed BLDCM module which optimized the air compressor is available and practical.

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