

基于蚁群算法的内燃机配气机构凸轮型线的动力学仿真

Dynamic simulation of distribution cam mechanism in internal combustion engine based on ant colony algorithm

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中文摘要:

针对内燃机配气机构工作时的振动、冲击和噪声问题,建立了内燃机配气凸轮机构型线的动力学数学模型,运用蚁群算法和Matlab语言,对该数学模型进行了仿真优化计算,与原设计相比,仿真结果表明:丰满系数提高了1.24%,动态最大正加速度在上升段下降了0.87%,在下降段上升了5.23%,动态最大负加速度下降了5.93%,使得系统动态速度和动态加速度趋于平稳,有效地减少了内燃机配气机构的冲击振动,提高了内燃机的动力性能,而且优化效果好于遗传算法。

英文摘要:

In order to solve the problem of distribution cam mechanism vibration, crash and noise in operation, a dynamical optimization model regarding distribution cam mechanism in internal combustion engine was developed. Based on ant colony algorithms and MATLAB, optimization programs concerning the model were developed and simulation was conducted. Compared with original design, the simulation results show that plentiful coefficient increased by 1.24%, dynamical maximum positive acceleration lowers by 0.87% in ascending and increases by 5.23% in descending. The maximum negative acceleration decreases by 5.93%. All these make system dynamical velocity and dynamical acceleration stable and reduce shock vibration effectively, the optimization effect is better than genetic algorithms do.

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