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论文

基于混合PSO-SQP 算法同时实现多变量的结构和参数辨识

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摘要：

研究了一种基于混合粒子群优化算法和序列二次规划算法对系统进行辨识的新方法. 该方法将典型数学模型相互组合构成系统模型. 首先将系统结构辨识问题转化为组合优化问题; 然后利用混合PSO-SQP 同时实现系统的结构辨识和参数辨识. 为了进一步说明该混合算法的有效性, 与标准PSO 算法和惯性权值逐减PSO 算法进行对比. 仿真结果表明, 给出的混合算法是有效的, 辨识精度高, 并具有良好的实用性.

关键词： 结构辨识；参数辨识；组合优化；混合粒子群优化；序列二次规划

Hybrid PSO-SQP for simultaneous identification of structure and parameters in a multivariate system

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Abstract:

This paper presents a novel and efficient method to realize both structure and parameter identification in a multivariable system with hybrid particle swarm optimization(PSO) algorithm and the sequential quadratic programming(SQP) algorithm. The conbination of classic mathematical models constitute a system model, so the problem of system structure identification is transformed into a problem of combinatorial optimization. Then by using hybrid PSO algorithm and the SQP algorithm, both structure and parameter identification of the system are realized at the same time. In order to further illustrate the effectiveness of the algorithm, the proposed method is compared with the standard PSO algorithm and the dynamical inertia weight of PSO algorithm. The simulation results show that the proposed hybrid algorithm is reasonable, effective, and has high precision and practicability.

Keywords: structural identification； parameter identification；combination optimization； hybrid particle swarm optimization； sequential quadratic programming

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