论文与报告

分散控制系统结构的综合及其工业应用

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摘要
本文论述了连续工业过程中分散控制结构的综合问题. 首先讨论了一般分散控制结构的可行性问题,并给出了存在相应的分散控制器使闭环系统具有渐近稳定性、终值无偏性及鲁棒性的结构要求. 其次研究了最经济结构的综合问题,提出了获得最少测量、最少控制与最简单反馈结构的相应算法以及该综合算法的工业应用实例.
关键词　　分散鲁棒控制　结构可行性　结构综合　催化裂化装置
分类号

The Synthesis of Decentralized Control System and its Application

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Abstract
The problem of synthesis of the decentralized control structure in continuous industrial processes is addressed in this paper. Firstly, the feasibility of general decentralized control structure (GDCS) is discussed. The necessary and sufficient conditions will be given. It is shown that under these conditions, there exists a corresponding decentralized robust controller that ensures the asymptotic stability of the resulting closed-loop system. Secondly, the problem of finding the simplest feasible GDCS is also studied. A relevant synthesizing algorithm in order to find minimal measurement variables, minimal control variables, and the simplest feedback structure is given. The synthesis algorithm has been successfully applied to the control system design and synthesis for a reactor-regenerator system in a fluidized catalytic cracking unit.
Key words　Decentralized robust control　structure feasibility　control structure synthesis　fluidized catalytic cracking unit

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