上海交通大学自动化系
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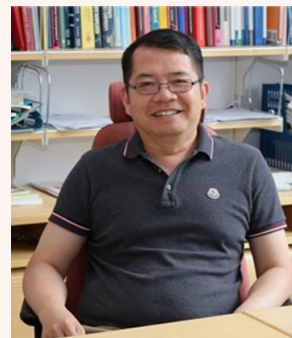
学术报告会

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Turing's Model and Minimal Control Placement

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摘要:

In this talk we will first discuss the general Turing's model for the diffusion of morphogens and explore its connection to emergence by self-organization. Turing's model describes the process of morphogens diffusing and reacting with each other and is considered as one of the most fundamental models to explain pattern formation in a developing embryo. Controlling pattern formation artificially in some optimal way has gained increasing attention in the field of development biology and serves as an intermediate step towards our goal of producing emergence, which motivates us to investigate this problem further. We thus move on to discuss the minimal control placement problem for the discretized Turing's model. The minimal control placement problem for the diffusion system is investigated first. The symmetric control sets are defined based on the symmetry of the network structure. Then we study the reaction-diffusion system by means of suitable extension of the symmetric control sets.

简介:

胡晓明，1983 年于中国科技大学获学士学位，1989年于美国亚历桑那州立大学获哲学博士学位,导师为著名非线性系统专家Christopher Byrnes。1989年获瑞典皇家理工学院（KTH）的Göran Gustafsson博士后奖金，1991年后在KTH数学系任职。2003年晋升为优化与系统理论方向正教授。曾任优化与系统理论实验室任，曾兼任KTH机器人中心副主任，及KTH网络系统国家重点中心（ACCESS Linaeus Center）的执委会委员，及该两中心董事会董事。胡晓明教授领导或参与了大量来自欧盟，瑞典研究基金会，瑞典战略研究基金会，后勤装备部及瑞典空间中心的科研项目，以及大量国际会议的组织工作，国际期刊的编委工作。研究方向主要为非线性反馈控制、非线性观测器设计、传感与主动感知、多自体系统的建模，分析及控制等，是目前活跃在国际控制理论领域的著名学者。他迄今发表200多篇论文及两本专著。