<<复杂网络控制技术>>

图书基本信息

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内容概要

电力网络、柔性制造、移动通信等等互连都形成了复杂网络。
本书着眼于复杂网络系统中的共性问题，综合了作者多年来在该方向深入、系统的研究成果，给出了建立网络模型所需要的工具和哲学思想，详细具体地把握了其动力学本质，同时简明地揭示了有效控制的解决方案及其分析。
本书内容分为三个部分：第一部分为建模与控制，第二部分为负荷调度，第三部分为稳定性及性能分析。
本书内容循序渐进，每章均附有习题并提供习题解答。
基础章节部分要求读者具有随机过程和线性代数知识，适用于信息类、电子类等专业高年级本科生，高级部分则适用于研究生、研究人员和从业者。

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作者简介

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担任系统与控制、应用概率等领域多个期刊的编委。
与他人合著的图书Markov Chains and Stochastic Stability获1994年ORSA／TIMS最佳著作奖。
在MIT4 UTRC等世界各地多个大学担任客座教授。
他的研究兴趣包括随机过程、最优化、复杂网络以及信息论等。

书籍目录

章节摘录

插图：More history on Brownian models is contained in the Notes for Chapter 5. This book provides foundations for resource allocation and perfonnance evaluation, but can- not go too deeply into specific issues in each possible application. A notable example is the area of Internet congestion control where there are many constraints due to the reliance on ar- chitecture and algorithms designed in the 1970s. Srikant's monograph [459] treats this problem in-depth using a range of techniques, including variants of methods described in this book. Although much of this book concerns the construction and analysis of algorithms to con- struct feedback laws for control, to bound performance, or to improve simulation, this book does not contain any theory of algorithms. In particular, we do not touch upon complexity the- ory for algorithms as described in [390, 391,392, 115, 42, 194], although this theory is the most important motivation for the approximation techniques developed in the book. The optimal control problems posed in this book are primarily centralized in the sense that there is a centralized decision maker that possesses complete information. A decentralized con- tro[solution is one that can be implemented based on local information, such as nearby con- gested links. For a physical network such as the Internet, or the North American power grid, a centralized control framework is absurd. For example, in a power distribution system generators may be owned by different companies, who supply power to various utilities, using power lines man- aged by different system operators. Methods from game theory can be applied to study the consequences of potential outcomes in a decentralized noncooperative setting [31,412]. We do not address any of these game-theoretic issues. However, the centralized optimal policy can be used as a benchmark against which the performance of a decentralized system is evaluated.Moreover, we do consider classes of policies that can be implemented using only local in- formation. One example is the class of MaxWeight policies introduced in Section 4.8. These are a subset of myopic: policies. In some cases it can be shown that a myopic policy is approx- imately optimal if the network is congested, or the network load is high （see Chapter 9 and Theorem 10.0.2）.