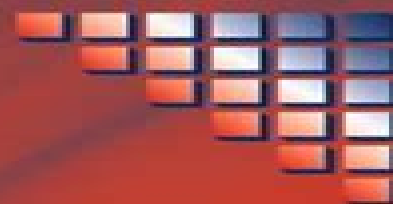


Communications and Control Engineering

Andrew Clark
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Submodularity in Dynamics and Control of Networked Systems

With a Foreword by John Baillieul

 Springer

Nice Book Submodularity Dynamics Networked Communications Engineering

Jorgen Bang-Jensen, Gregory Z. Gutin



Nice Book Submodularity Dynamics Networked Communications Engineering:

Submodularity in Dynamics and Control of Networked Systems Andrew Clark,Basel Alomair,Linda Bushnell,Radha Poovendran,2015-12-21 This book presents a framework for the control of networked systems utilizing submodular optimization techniques The main focus is on selecting input nodes for the control of networked systems an inherently discrete optimization problem with applications in power system stability social influence dynamics and the control of vehicle formations The first part of the book is devoted to background information on submodular functions matroids and submodular optimization and presents algorithms for distributed submodular optimization that are scalable to large networked systems In turn the second part develops a unifying submodular optimization approach to controlling networked systems based on multiple performance and controllability criteria Techniques are introduced for selecting input nodes to ensure smooth convergence synchronization and robustness to environmental and adversarial noise Submodular optimization is the first unifying approach towards guaranteeing both performance and controllability with provable optimality bounds in static as well as time varying networks Throughout the text the submodular framework is illustrated with the help of numerical examples and application based case studies in biological energy and vehicular systems The book effectively combines two areas of growing interest and will be especially useful for researchers in control theory applied mathematics networking or machine learning with experience in submodular optimization but who are less familiar with the problems and tools available for networked systems or vice versa It will also benefit graduate students offering consistent terminology and notation that greatly reduces the initial effort associated with beginning a course of study in a new area

Valuation of Network Effects in Software Markets Andreas Kemper,2009-12-12 The customer base is an important value driver of software companies and a reliable prediction of its development is fundamental for investment decisions A particularity in software markets is that an individual s purchasing decision is often influenced by other users choices Although such customer network effects are evident their quantitative assessment remain elusive with conventional approaches This book contributes to closing this gap by developing methods for measuring network effects and their implications for valuation in software markets Based on the theory of complex networks the book reveals that such diffusion processes highly depend on structural properties of customer networks Moreover it depicts that such insights are contributions to improve the quality of valuations in software markets But the implications of this research also comprise social and political aspects as they can be applied in order to prevent corporate failures in all network effect markets

Cumulative Book Index ,1998 A world list of books in the English language

Digraphs Jorgen Bang-Jensen,Gregory Z. Gutin,2013-06-29 Graph theory is a very popular area of discrete mathematics with not only numerous theoretical developments but also countless applications to practical problems As a research area graph theory is still relatively young but it is maturing rapidly with many deep results having been discovered over the last couple of decades The theory of graphs can be roughly partitioned into two branches the areas

of undirected graphs and directed graphs digraphs Even though both areas have numerous important applications for various reasons undirected graphs have been studied much more extensively than directed graphs One of the reasons is that undirected graphs form in a sense a special class of directed graphs symmetric digraphs and hence problems that can be formulated for both directed and undirected graphs are often easier for the latter Another reason is that unlike for the case of undirected graphs for which there are several important books covering both classical and recent results no previous book covers more than a small fraction of the results obtained on digraphs within the last 25 years Typically digraphs are considered only in one chapter or by a few elementary results scattered throughout the book Despite all this the theory of directed graphs has developed enormously within the last three decades There is an extensive literature on digraphs more than 3000 papers Many of these papers contain not only interesting theoretical results but also important algorithms as well as applications

Brinkman's catalogus van boeken en tijdschriften, 2001 With 1901 1910 1956 1960 Repertorium is bound Brinkman's Titel catalogus van de gedurende 1901 1910 1956 1960 Title varies slightly International Books in Print, 1986 **Dissertation Abstracts International**, 1986 **Documentation Abstracts**, 1995 *Submodular Rate Region Models for Multicast Communication in Wireless Networks* Maximilian Riemensberger, 2017-08-29 This book proposes representations of multicast rate regions in wireless networks based on the mathematical concept of submodular functions e.g. the submodular cut model and the polymatroid broadcast model These models subsume and generalize the graph and hypergraph models The submodular structure facilitates a dual decomposition approach to network utility maximization problems which exploits the greedy algorithm for linear programming on submodular polyhedra This approach yields computationally efficient characterizations of inner and outer bounds on the multicast capacity regions for various classes of wireless networks

Submodularity and Its Applications in Wireless Communications Ni Ding, 2017 This monograph studies the submodularity in wireless communications and how to use it to enhance or improve the design of the optimization algorithms The work is done in three different systems In a cross layer adaptive modulation problem we prove the submodularity of the dynamic programming DP which contributes to the monotonicity of the optimal transmission policy The monotonicity is utilized in a policy iteration algorithm to relieve the curse of dimensionality of DP In addition we show that the monotonic optimal policy can be determined by a multivariate minimization problem which can be solved by a discrete simultaneous perturbation stochastic approximation DSPSA algorithm We show that the DSPSA is able to converge to the optimal policy in real time For the adaptive modulation problem in a network coded two way relay channel a two player game model is proposed We prove the supermodularity of this game which ensures the existence of pure strategy Nash equilibria PSNEs We apply the Cournot tatonnement and show that it converges to the extremal the largest and smallest PSNEs within a finite number of iterations We derive the sufficient conditions for the extremal PSNEs to be symmetric and monotonic in the channel signal to noise SNR ratio Based on the submodularity of the entropy function we

study the communication for omniscience CO problem how to let all users obtain all the information in a multiple random source via communications In particular we consider the minimum sum rate problem how to attain omniscience by the minimum total number of communications The results cover both asymptotic and non asymptotic models where the transmission rates are real and integral respectively We reveal the submodularity of the minimum sum rate problem and propose polynomial time algorithms for solving it We discuss the significance and applications of the fundamental partition the one that gives rise to the minimum sum rate in the asymptotic model We also show how to achieve the omniscience in a successive manner

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