Foreword

Heterogeneous small cell networks can potentially handle the challenge of the cost-effectively supporting a 1000-fold increase in traffic demand for future 5G networks. However, the interference mitigation, resource management, coverage optimization, and self-organizing white-space spectrum access should be paid much attention from academia, industry, and standardization. Game theory can characterize, analyze, and model the strategic interactions and the rational behaviors of macrocell eNBs and small cell eNBs, so that it facilitates to design the distributed management and control algorithms with capacity enhancement and energy consumption into consideration.

This book investigates game-theoretic approaches to challenged techniques in heterogeneous small cell networks with the following sections: In session 1, game theoretic models are surveyed including complete information-supported non-cooperative potential games (Chapter 1) and cooperative coalition games (Chapter 2), and games with incomplete information (Chapter 3). Session 2 from Chapter 4 to Chapter 11 is the main part, where interference mitigation, power control, coverage optimization, etc. are investigated via various game models. In Session 3, we employ advanced game theory to variety of application scenarios: the physical layer security (Chapter 12), infrastructure sharing (Chapter 13) and renewable energy (Chapter 14) for green communications, and then we concentrate on the challenges and application of game theory for promising wireless services including multimedia and social interactions (Chapter 15) and cooperative video transmission by broadcasting (Chapter 16).

The topic is timely and interesting. The editors carefully chosen the promising topic, and excellently selected the up-to-date chapters addressing these technical aspects. The surveyed game models are novel. This book covers many types of games and their applications in wireless networks. The targeted audiences of the book are either students or researchers to get valuable insights into their own research. I am sure it will be an important reference for many years in the field of game theory for wireless engineers.

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