

Preface

The current static spectrum management policies have caused a severe dilemma of spectrum scarcity versus under-utilization. Accordingly, the emerging Cognitive Radio (CR) technology, which allows dynamic spectrum access, has been widely deemed as a promising candidate to improve the utilization of the precious natural resource-radio spectrum for the next generation of wireless communication. Given the space-time-frequency variation in wireless communication environment, dynamic resource allocation serves as a pivotal issue to achieve the high performance of CR systems.

This brief is intended to provide a summary survey of different dynamic resource allocation schemes in CR systems, with focuses on, particularly, the spectral-efficiency and energy-efficiency in wireless communication networks. With a summary introduction of the landscape of CR technology, we detail the dynamic resource allocation problem for its motivation and challenges in CR systems. In terms of preferences, the network operator may be inclined more toward Spectral-Efficiency (SE) or Energy-Efficiency (EE) metrics in practical systems. Accordingly, the Spectral- and Energy-Efficient resource allocation schemes are comprehensively investigated in this monograph, respectively. Besides, through extensive analysis, we also explore the interrelationship between the SE and the EE, and further throw new insights into the SE-EE trade-off for operating strategies. We hope that this brief will be used as a reference for practicing engineer and researchers in the field of wireless communications.

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