Co-channel and Adjacent Channel Interference Mitigation in Cognitive Radio Networks

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Abstract

Cognitive radio (CR) is a paradigm of sharing spectrum among licensed (or, primary) and unlicensed (or, CR) users. In CR networks, interference mitigation is crucial not only for primary user protection, but also for the quality of service of CR users. We consider the problem of interference mitigation via channel assignment and power allocation for CR users. We develop a cross-layer optimization framework for minimizing both co-channel and adjacent channel interference; the latter has been shown to have considerable impact in practical systems. Spectrum sensing, opportunistic spectrum access, channel assignment, and power allocation are considered in the problem formulation. We propose a reformulation-linearization technique (RLT) based centralized algorithm that computes near-optimal solutions in polynomial time, and a distributed greedy algorithm that uses local information. Both algorithms are evaluated with simulations and are shown quite effective for mitigating both types of interference and achieving high CR network capacity.

Bio

Donglin Hu received the M.S. degree from Tsinghua University, Beijing, China, in 2007 and the B.S. degree from Nanjing University of P&T, Nanjing, China in 2004, respectively, all in electrical engineering. Since 2007, he has been pursuing the Ph.D. degree in the Department of Electrical and Computer Engineering, Auburn University, Auburn, AL. His research interests include cognitive radio networks, cross-layer optimization, algorithm design for wireless network and multimedia communications.

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