Heterogeneous Spectrum Aggregation: Coexistence from a Queue Stability Perspective

ABSTRACT

Spectrum aggregation (SA) across heterogeneous channels, including both dedicated and shared channels, provides the potential for improving spectrum utilization and fulfilling the requirement of broadband services. Heterogeneous SA brings new technical challenges on multi-system coexistence on shared channels and the resource allocation over heterogeneous channels. In this paper, we develop an analytical framework for heterogeneous SA from a queue stability perspective. To make all systems on the shared channels stable, we design a resource allocation algorithm for the coexistence of multiple systems. Specifically, we derive the closed-form modified water-filling power control for the single-pair case by Lyapunov optimization and prove that it achieves the queue stability for all systems. Based on the results, we propose a low-complexity suboptimal resource allocation algorithm for multi-pair SA, which is a Nphard problem. We partition user pairs into groups by using graph coloring and allocate the shared channels to pair groups according to the maximal weight bipartite matching model. The simulation results verify the queue stability and show that the proposed schemes outperform the conventional schemes.

EXISTING SYSTEM

- In existing system, distributed algorithm is proposed for opportunistic spectrum sharing based on LBT to avoid interference.
- we allow simultaneous transmission and address the interference issue head-on to fully exploit the available spare capacity of the shared channel.
- Because it is not possible to control the actions of the devices in the sharing system, and the global information of the queue length of the users in the sharing system cannot be precisely known.

PROPOSED SYSTEM

- We propose a low-complexity suboptimal resource allocation algorithm for multi-pair heterogeneous SA.
- Our goal for heterogeneous SA is determining the resource allocation to stabilize both the SA system and the sharing system with the transmit power constraints.
- The aim is to partition the user pairs in the SA system into groups according to their mutual interference. User pairs in the same group have relatively small interference to each other.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

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