Hamilton Institute

Dynamic Resource Management for Wireless Networks Using Hybrid Systems

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Tuesday, January 18th, 2005

Abstract

Dynamic resource allocation in wireless networks is important for efficient utilization of the spectrum and maintaining reliable communication links between transmitters and receivers. In order to achieve these objectives, the transmitted powers/rates, base station assignments, and allocated channels may need to be updated as the users move around or when new calls are admitted to the network.

In the first part of the talk, we will address integrated power control and handoff design for cellular networks using hybrid systems and dynamic programming, and propose new joint hard/soft handoff and power control algorithms that are suitable for implementation in the next generation wireless networks. The proposed algorithms present a paradigm shift in integrated handoff/power control by capturing the tradeoff between user satisfaction and network overhead, therefore enjoy the advantages of joint resource allocation, and provide significant improvement over existing methods.

The second part of the talk will focus on dynamic properties of distributed power control for time-varying channels. Through simulations we demonstrate that a well known distributed control algorithm by Foschini and Miljanic may fail to converge in the presence of shadowing, handoffs, and rate variations. In order to better explain this observation, and provide a systematic framework to study the stability of distributed power control algorithms in general, we present the problem in the context of switched systems that leads to interesting stability problems involving M-matrices.

Venue: Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

Time: 1.00 - 2.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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