Optimal resource allocation in wireless communication and networking
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ISN Seminar Speaker:
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Abstract

Many problems in optimal design in wireless communications and networking necessitate the allocation of power across fading states. These problems are challenging because: (i) The number of fading states, and as a consequence the number of power allocations to be determined, is infinite. (ii) Constraints in the resource allocation variables are typically not convex. (iii) The channels’ probability distributions are unknown. In this talk we will see that for a wide class of problems the duality gap of the resulting optimization problems is null despite the presence of non-convex constraints. Because dual functions are always convex, this property permits solution and analysis in the dual domain. We will further exploit this property to introduce a class of ergodic stochastic optimization (ESO) algorithms to solve resource allocation problems in wireless communications and networking. Salient features of ESO algorithms are that they do not require access to the state’s probability distribution, that they can handle non-convex constraints in the resource allocation variables, and that convergence to optimal operating points holds almost surely.

Biography

Alejandro Ribeiro is an assistant professor at the Department of Electrical and Systems Engineering at the University of Pennsylvania, Philadelphia, where he started in 2008. He received the B.Sc. in electrical engineering from the Universidad de la Republica Oriental del Uruguay, Montevideo, in 1998. From 2003 to 2008 he was at the Department of Electrical and Computer Engineering, the University of Minnesota, Minneapolis, where he received the M.Sc. and Ph.D. in electrical engineering. From 1998 to 2003 he was a member of the technical staff at Bellsouth Montevideo. His research interests lie in the areas of communication, signal processing, and networking. His current research focuses on wireless communications and networking, distributed signal processing, wireless sensor networks, and communications for mobile robots. He is a Fulbright scholar and received the NSF CAREER award in 2010. He is also the recipient of student paper awards at ICASSP 2005 and ICASSP 2006.