

Fecha: 27 de Junio

Hora : 11:00 - 12:00

Lugar: Salón de grados del Departamental I. Campus de Fuenlabrada.

TÍTULO: Low-Complexity Channel Equalization and Estimation for Mobile OFDM

PONENTE: Geert Leus (Faculty of Electrical Engineering, Mathematics and Computer Science, Delft University of Technology)

ABSTRACT:

Wireless communications are becoming an important part of everyday life. Think for instance about UMTS, WLANs, WiMAX, DAB, DVB, etc. Most of these systems have been designed assuming that the wireless channel can be regarded as constant over a block of data. Doppler shifts due to mobility, however, introduce channel time-variations, which become more pronounced as the carrier frequency increases, and basically violate the time-invariance assumption. Recently, several approaches have been proposed for the equalization and estimation of such time-varying effects in the context of orthogonal frequency division multiplexing (OFDM), which is a modulation scheme that appears in many wireless systems, such as WLANs, WiMAX, DAB, DVB, etc. Most of the proposed equalization algorithms for OFDM have a cubic or quadratic complexity in the number of subcarriers. In this talk, we present some low-complexity equalizers, which exploit the banded nature of the channel matrix in the frequency-domain. Those equalizers have a complexity that is only linear in the number of subcarriers. In addition, we try to boost the performance of those banded equalizers by designing a receiver window that is tailored to improve the banded assumption of the channel matrix in the frequency-domain. Next, in order to simplify channel estimation, we propose a low-order approximation of the time-varying channel using a so-called basis expansion model (BEM). Exploiting the structure of the BEM, the time-varying channel can easily be estimated based on only a few pilot symbols. The proposed ideas pave the way for the use of OFDM applications under high-Doppler conditions.

BIO:

Geert Leus was born in Leuven, Belgium, in 1973. He received the electrical engineering degree and the PhD degree in applied sciences from the Katholieke Universiteit Leuven, Belgium, in June 1996 and May 2000, respectively. He has been a Research Assistant and a Postdoctoral Fellow of the Fund for Scientific Research - Flanders, Belgium, from October 1996 till September 2003. During that period, Geert Leus was affiliated with the Electrical Engineering Department of the Katholieke Universiteit Leuven, Belgium. Currently, Geert Leus is an Assistant Professor at the Faculty of Electrical Engineering, Mathematics and Computer Science of the Delft University of Technology, The Netherlands. During the summer of 1998, he visited Stanford University, and from March 2001 till May 2002 he was a Visiting Researcher and Lecturer at the University of Minnesota. His research interests are in the area of signal processing for communications. Geert Leus received a 2002 IEEE Signal Processing Society Young Author Best Paper Award and a 2005 IEEE Signal Processing Society Best Paper Award. He is a member of the IEEE Signal Processing for Communications Technical Committee, and an Associate Editor for the IEEE Transactions on Wireless Communications, the IEEE Transactions on Signal Processing, the IEEE Signal Processing Letters, and the EURASIP Journal on Applied Signal Processing.