Guest Lecture

HAEC

Secure transmission with incremental redundancy over fading wiretap channels

Prof. Stefano Tomasin

Department of Information Engineering, University of Padova, Italy

Tuesday, 24 September 2013
10:00 am - 11:00 am
Room: BAR I/15

Abstract: The seminar will provide the most recent results on the secure transmission by means of physical layer security over fading channels by using an incremental redundancy retransmission technique similar to hybrid automatic repeat request (HARQ). In particular, for the classic secure message transmission scenario where Alice transmits to agent Bob a message that must be kept secret to a third agent Eve, we assume that Alice does not know channel conditions (neither to Bob nor to Eve) before transmission. However a feedback public channel is available by which Bob can inform Alice about decoding. Then we consider a retransmission technique where at each retransmission incremental redundancy is transmitted that Bob can combine with previous transmission in order to improve decoding capability. However, contrary to conventional HARQ, here we also impose that the probability that Eve gets any information on the secret message is kept below a given value. Details on the secure encoding strategy will be provided, together with conditions by which perfect secrecy and decodability are achieved. Outage probability (by both Bob and Eve) are then characterized and numerical results discussed.

Bio: Stefano Tomasin received the Laurea degree and the Ph.D. degree in Telecommunications Engineering from the University of Padova, Italy, in 1999 and 2003, respectively. In the Academic year 1999-2000 he was on leave at the IBM Research Laboratory, Zurich, Switzerland, doing research on signal processing for magnetic recording systems. In the Academic year 2001-2002 he was on leave at Philips Research, Eindhoven, the Netherlands, studying multicarrier transmission for mobile applications. He joined University of Padova first as contractor researcher for a national research project (2002) and then as Assistant Professor (2005). In the second half of 2004 he was visiting faculty at Qualcomm, San Diego (CA) doing research on receiver design for mobile cellular systems. In 2007 he has been visiting Polytechnic University in Brooklyn, NY, working with prof. Elza Erkip on cooperative networks. His current research interests include phyisical layer security, signal processing and scheduling for wireless communications, optimization techniques for smart grids. He is senior member of IEEE since 2011 and member of IEEE since 1999. Since 2011 he is Editor of IEEE Transactions of Vehicular Technologies and EURASIP Journal of Wireless Communications and Networking.

TECHNISCHE UNIVERSITÄT DRESDEN **DRESDEN concept** **DFG**