

Title: Wireless Challenges for 5G Mobile Broadband Communications

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Abstract:

Enhanced mobile broadband (eMBB) is one of important communication services in the 5th generation (5G) mobile communications networks. Currently, the development of 5G networks is intensified. 5G networks must be highly spectrum and energy efficient. We will present two possible approaches toward 5G eMBB: distributed MIMO and the dense heterogeneous network (dense HetNet).

The first part of my talk will address the recent advances in distributed MIMO. A large number of distributed antennas are deployed over a macro-cell area covered by a macro-cell base station (MBS). Only a few distributed antennas near a user equipment are selected for distributed MIMO cooperative transmission. It includes single-user diversity, multi-user multiplexing, and blind selective mapping (blind SLM). Blind SLM effectively reduces the peak-to-average power ratio (PAPR) of transmit signal waveform.

The second part of my talk will address the recent advances in distributed radio resource management (RMM) for the dense heterogeneous network (dense HetNet). A large number of small base stations (SBSs) are deployed over a macro-cell area. An important technical issue is to simultaneously reduce the co-channel interference and power consumption. A promising approach for distributed RMM is to use a game theoretic SBS power on/off algorithm and a distributed dynamic channel assignment.

Biography:

Fumiyuki Adachi received B.S. and Dr. Eng. degrees in electrical engineering from Tohoku University, Sendai, Japan, in 1973 and 1984, respectively. In April 1973, he joined NTT Laboratories and conducted various researches on digital cellular mobile communications. From July 1992 to December 1999, he was with NTT Docomo, where he led a research group on Wideband CDMA for 3G networks. Since January 2000, he has been with Tohoku University, Sendai, Japan. He was a full professor until March 2016 and is now a Specially Appointed Professor for Research at the Research Organization of Electrical Communication (ROEC) at Tohoku University.

He is an IEEE Life Fellow and an IEICE Fellow. He is a recipient of the IEEE Vehicular Technology Society (VTS) Avant Garde Award in 2000, IEICE Achievement Award in 2002, Thomson Scientific Research Front Award in 2004, Ericsson Telecommunications Award in 2008, Telecom System Technology Award in 2009, Prime Minister Invention Award in 2010, British Royal Academy of Engineering Distinguished Visiting Fellowship in 2011, KDDI Foundation Excellent Research Award in 2012, IEEE VTS Conference Chair Award in 2014, C&C Prize in 2014, Rinzaburo Shida Award in 2016, Sendai Municipal Commendation in 2017, IEEE VTS Stuart Meyer Memorial Award in 2017, etc. He is listed in Highly Cited Researchers 2001 (<http://hcr.stateofinnovation.thomsonreuters.com/page/archives>).