Keynote Speech VI

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Code Hopping Multiple Access Based on Orthogonal Complementary Codes

Abstract: Code hopping multiple access (CHMA) is a newly emerging multiple access technique with its potential to offer a high security and capacity. Unfortunately, orthogonality amongst user signals in existing CHMA schemes can be preserved only in synchronous channels under an assumption that neither multipath interference (MI) nor multiple access interference (MAI) exists. Exploiting their ideal orthogonality, we apply orthogonal complementary codes to CHMA systems to overcome the problems with existing CHMA schemes. In particular, we will show that the application of orthogonal complementary codes can significantly improve the performance of a CHMA system due to its unique collision resistant capability. The properties and BER performance of the proposed system are analyzed for both uplink and downlink applications, where the system may suffer MI and MAI simultaneously. Simulation results show that the complementary coded CHMA with channel coding can provide a high capacity and a robust performance.

Short Bio: Hsiao-Hwa Chen is currently a Distinguished Professor in the Department of Engineering Science, National Cheng Kung University, Taiwan. He obtained his BSc and MSc degrees from Zhejiang University, China, and a PhD degree from the University of Oulu, Finland, in 1982, 1985 and 1991, respectively. He has authored or co-authored over 400 technical papers in major international journals and conferences, six books and more than ten book chapters in the areas of communications. He served as the general chair, TPC chair and symposium chair for many international conferences. He served or is serving as an Editor or and Guest Editor for numerous technical journals. He is the founding Editor-in-Chief of Wiley’s Security and Communication Networks Journal (www.interscience.wiley.com/journal/security). He is the recipient of the best paper award in IEEE WCNC 2008 and a recipient of IEEE Radio Communications Committee Outstanding Service Award in 2008. Currently, he also served as the Editor-in-Chief for IEEE Wireless Communications from 2012 Feb to 2015 June. He is a Fellow of IEEE, a Fellow of IET, and an elected Member at Large of IEEE ComSoc.