A Method of Constellation Blind Detection for Spectrum Efficiency Enhancement

Jian Zhang, Xin Wang, Xianjun Yang

Fujitsu Research and Development Center Co., Ltd., Beijing P.R. China

zhangjian1288@cn.fujitsu.com

***Abstract*—Modulation classification is a technique to achieve blind estimation of modulation types. Thereby, signaling overhead can be reduced or equivalently spectrum efficiency can be improved. However, the benefit is limited in coded systems, since the code rate information have to be signaled anyway. To fulfill the requirement of higher spectrum efficiency in 5th generation (5G) systems, a method of constellation blind detection is proposed in this paper. By performing rotation and interleaving onto normal constellations, a new shape of constellation is created, and it can be distinguished from the normal constellation by blind detection at the receiver side. The advantage of the proposed method is twofold. Firstly, additional information bits can be carried by blind detection and thus enhancing spectrum efficiency. Secondly, constellation rotation can provide diversity gain. Simulation results have verified the effectiveness of our proposed method.**

***Keyword*—5G, constellation blind detection, modulation classification, NOMA**

Jian Zhang was born in Liaoning Province, China in 1983. He received Ph.D. degree in wireless communication from Beijing University of Posts and Telecommunications (BUPT), China, in 2011. He has been working as a researcher in Fujitsu R&D Center Co., Ltd. (FRDC) Beijing China since 2011. His research interests include MIMO, CoMP and related standardization in 3GPP. Currently he is focusing on potential non-orthogonal and multiple access techniques for 5G new RAT.

Xin Wang was born in Tianjin, China in 1971. He received Ph.D. degree from Tianjin University, China, in 2005. He has been with Fujitsu R&D Center Co., Ltd. (FRDC) since 2005. He is currently heading the group for 5G study in FRDC's Communication Lab. His recent research interests include wireless signal processing with emphasis on 5G new RAT and 3GPP standardization.

Xianjun Yang was born in Shandong Province, China in 1986. She received her PhD degree in Telecommunications and Information System from Beijing University of Posts and Telecommunications (BUPT) in 2014, and another PhD degree in Electronic Engineering from Macquarie University in 2015, respectively. She is currently working as a researcher in Fujitsu Research and Development Center (FRDC) in Beijing. Her recent research interests include new multiple access technologies for 5G, new waveform, and the applications of compressed sensing in wireless communications.