

# Performance Enhancement for Co-Channel Interference Cancellation with Smart Antenna and Power Adaptive in Cooperative Communication

Wuttipan Duangsri\*\*, Mongkol Somrobru\*, Nikorn Sutthisangiam\*\*

\*TOT Academy, TOT Public Company Limited Bangkok, Thailand

\*\*Department of Computer and Information Science, Faculty of Applied Science,  
King Mongkut's University of Technology North Bangkok, Thailand  
wuttipan.d@gmail.com, mongkols@tot.co.th, nikorns@gmail.com

**Abstract**— Co-channel interference cancellation method are investigated for cooperative communication employing a decode-and-forward protocol when the base station is disturbed by the co-channel interference (CCI). In order to solve such interference problem, the beamforming method with the appropriate weight estimation for a smart antenna at the base station will be employed. We can also control the transmitted power at the interfering source, and maintain nearly a full diversity gain compared with the existing decode-and-forward cooperative communication. The network performance can be enhanced by the proposed power adaptive at the interference source by the quality of channel criterion and signal combining method. The maximum ratio combining (MRC) and the cooperative maximum ratio combining (C-MRC) are used to combine the received signals arrived at the base station to achieve the minimum probability of error based on the experimental results from simulations. The results show proposed method in C-MRC systems had the lower probability of error than MRC because the effect of three gain factors: the antenna array gain obtained from the beamforming algorithm, the power gain of the proposed power adaptive strategy, and the diversity gain obtained from a signal combining of received signals from the relay.

**Keywords**— *Interference Cancellation, Beamforming, Power adaptive, Diversity Gain, Cooperative Maximum Ratio Combining (C-MRC)*



**Wuttipan Duangsri** received his Bachelor degree in Computer Engineering from Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand in 2010. He is studying in Master degree in Department of Computer and Information Science, Faculty of Applied Science, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. His current research interests include wireless communication, channel estimation, cooperative communication.



**Mongkol Somrobru** received his Bachelor degree in Telecommunication Engineering from King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand in 1999. Master degree in Telecommunications Engineering from Asian Institute of Technology, Pathumthani, Thailand in 2005. Doctoral degree in Communication Engineering from The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Mongkut's University of Technology North Bangkok, Thailand in 2016, respectively. He is holding a lecturer and researcher at TOT Academy, TOT Public Company Limited Bangkok, Thailand. His current research interests include wireless communication, channel estimation, cooperative communication, statistical signal processing and The Internet of things (IoT).



**Nikorn Sutthisangiam** received his Bachelor degree in Electrical Engineering, Faculty of Engineering, King Mongkut's Institute of Technology North-Bangkok, Master of Science in Communications Engineering and Doctoral degree in Electrical Engineering from The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Mongkut's Institute of Technology North-Bangkok in 2003, 2006 and 2014, respectively. He is holding a lecturer at Department of Computer and Information Science, Faculty of Applied Science, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. His current research interests include wireless communication and embedded system.