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# THE CHINESE UNIVERSITY OF HONG KONG

Department of Information Engineering

*Seminar*

# Downlink Average Rate and SINR Distribution in Cellular Networks


**by**

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**Date : 26 April, 2016 (Tuesday)**
**Time : 10:00am – 11:00am**
**Venue : Room 833, Ho Sin Hang Engineering Building**
**The Chinese University of Hong Kong**


*Abstract*

The statistical characteristics of the signal to interference plus noise ratio (SINR) are closely related to many performance metrics of cellular networks. In this talk, the downlink average rate and SINR distribution are studied for orthogonal frequency division multiple access (OFDMA)-based cellular networks subject to the distance-dependent path loss and shadow fading (SF). With the analytical approximate mean and moment generating function (MGF) of the SINR in the logarithmic domain, the closed-form approximation for the lower and upper bounds of the average rate is obtained. Then the distribution of the SINR in the logarithmic domain is proposed to be approximated as the normal inverse Gaussian (NIG) distribution whose parameters are computed explicitly through moment matching. Also, the closed-form expression for the cumulative distribution function (CDF) of the SINR based on the NIG approximation is derived. Simulation results not only verify the tightness of the bounds, but also show that the NIG approximation is up to one order of magnitude more accurate than the Pearson type IV approximation and at least one order of magnitude more accurate than the lognormal approximation when the SF correlation coefficient is small or the standard deviations of the SF are large or different.

Besides, this talk will give a brief introduction of an open 5G platform, which applies SDN and NFV techniques to realize all the functions of a telecom operator on general CPU/GPU computing platform.


*Biography*

Yang Yang received the BEng and MEng degrees in Radio Engineering from Southeast University, Nanjing, P. R. China, in 1996 and 1999, respectively; and the PhD degree in Information Engineering from The Chinese University of Hong Kong in 2002.

Dr. Yang Yang is currently a professor with Shanghai Institute of Microsystem and Information Technology (SIMIT), Chinese Academy of Sciences, serving as the Director of CAS Key Laboratory of Wireless Sensor Network and Communication, and the Director of Shanghai Research Center for Wireless Communications (WiCO). He is also an adjunct professor with the School of Information Science and Technology, ShanghaiTech University. Prior to that, he has served the Department of Electronic and Electrical Engineering at University College London (UCL), United Kingdom, as a Senior Lecturer; the Department of Electronic and Computer Engineering at Brunel University, United Kingdom, as a Lecturer; and the Department of Information Engineering at The Chinese University of Hong Kong as an Assistant Professor. His research interests include wireless ad hoc and sensor networks, software defined wireless networks, 5G mobile systems, intelligent transport systems, wireless testbed development and practical experiments.

Dr. Yang Yang has co-edited a book on heterogeneous cellular networks (2013, Cambridge University Press) and co-authored more than 100 technical papers. He has been serving in the organization teams of about 50 international conferences, e.g. a co-chair of Ad-hoc and Sensor Networking Symposium at IEEE ICC'15, a co-chair of Communication and Information System Security Symposium at IEEE Globecom'15.

**** ALL ARE WELCOME ****


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