

Session Title: User Selection Scheme for Amplify-and-Forward Relaying with Zero Forcing

Abdurrahman Alfitouri



Biography: Abdurrahman Alfitouri (S'16) received the B.Sc. degree in electrical and electronic engineering from the Engineering Academy Tajoura, Tripoli, Libya, in 2004. He then received the M.Sc. degree in mobile communication engineering from Lancaster University, Lancaster, UK, in 2012. He is currently pursuing a Ph.D. degree with the microwave and communications systems (MACS) group of the University of Manchester. His current research interests in the wireless communications field including modelling and performance analysis of wireless communication systems and networks, as well as Relay systems.

Khairi A. Hamdi



Biography: Khairi Ashour Hamdi (M'99-SM'02) received the B.Sc. degree in electrical engineering from the University of Tripoli, Tripoli, Libya, in 1981; the M.Sc. degree (with distinction) from the Technical University of Budapest, Budapest, Hungary, in 1998; and the Ph.D. degree in telecommunication engineering from Hungarian Academy of Sciences, Budapest, in 1993. He was with the University of Essex, Colchester, U.K. He is currently with the School of Electrical and Electronic Engineering, The University of Manchester, Manchester, U.K. His current research interests include modelling and

performance analysis of wireless communication systems and networks, green communication systems, and heterogeneous mobile networks.

Abstract: In this paper, we report the results of an investigation and analysis of the performance of amplify and forward (AF) gateways employing zero forcing (ZF) beamforming techniques in a space division multiple access scenario. A random number of users are isolated from their destination(s) and can communicate with them only through an AF gateway equipped with multiple antennas and employing a ZF beamforming technique. The channels experience both small and large-scale fading. For large numbers of users, we introduce User Selection and Group Selection schemes, to keep the number of users less than or equal to the number of relay antennas in each group, with the goal of improving system performance. New, exact analytical expressions are derived for the overall spectral efficiency. The new results are used to investigate the impact of different system parameters on the overall efficiency of ZF gateways. The accuracy of the new results is confirmed through comparison with Monte Carlo simulations.