Abstract Title: Turbo Code Based Physical Layer Network Coding for Free Space Optical Channel

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Abstract

Physical layer network coding (PNC) for a two-way relay (TWR) channel yields an even greater throughput gain in wireless networks. PNC with a TWR channel is adopted free space optical (FSO) communication link (TWR-FSO) to enhance the link availability under the atmospheric turbulence condition. In this research we introduce the turbo code in the TWR-FSO PNC system and evaluate the end-to-end (E2E) in terms of the bit error rate (BER) for weak and strong regimes. The simulation results show that the proposed scheme can achieve a significant BER performance improvement through the introduction of an iterative process between turbo decoders. Furthermore, we present the extrinsic information transfer (ExIT) charts to evaluate the system convergence. The ExIT functions of the two decoders are thoroughly analysed for a range of parameters under the influence of a turbulence-induced channel fading to demonstrate the convergence behaviour.

Keywords—*Turbo code, Physical layer network coding, free space optical, turbulence, ExIT chart.*

Professional Biography

Alaa A. Saeed Al-Rubaie has completed his PhD in Communications of the Communications, Sensors, Signal and Information Processing (ComS^{2}IP) group from School of Electrical and Electronic Engineering, Newcastle University, Newcastle Upon Tyne, United Kingdom. He has MSc in Computer Network from University of Technology, High diploma (HD. Sc., postgraduate studies) in Computer Teaching and Learning from Informatics Institute of Higher Studies and B.Sc. from Baghdad University, Baghdad, Iraq.
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