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Pilot Assisted Visible Light Communications

Abstract: The pilot-assisted peak-to-average power ratio (PAPR) reduction technique for optical orthogonal frequency division multiplexing (OFDM) communication systems is simulated, analysed and empirically evaluated. The PAPR reduction is achieved by rotating the phase of data symbols with P iterations of randomly generated pilot symbol sequence. The results of our hardware implementation show a close agreement to that of computer simulations. Furthermore, we have obtained closed-form expression for complementary cumulative distribution function (CCDF) which shows close agreement with simulated results. In comparison with basic OFDM, where no PAPR reduction technique is implemented, experimental PAPR reduction gain of pilot-assisted OFDM (PA-OFDM) at a CCDF of 0.01 with $P = 5$ is about 1.6 dB. Furthermore, experimental results show that PAPR reduction gain increases as CCDF value decreases. The simulation and experimental results also show that the pilot-assisted technique does not cause deterioration of the bit error performance.

Biography: Sinan Sinanović has joined Glasgow Caledonian University in 2013. He has obtained his Ph.D. in electrical and computer engineering from Rice University, Houston, Texas, in 2006. In the same year, he joined Jacobs University Bremen in Germany as a post doctoral fellow. In 2007, he joined the University of Edinburgh in the UK where he has worked as a Research Fellow in the Institute for Digital Communications. While working with Halliburton Energy Services, he has developed acoustic telemetry receiver which was patented. He has also worked for Texas Instruments on development of ASIC testing. He has published over 60 papers in the areas of information theory, MIMO, interference management and visible light communication. He is a member of the Tau Beta Pi engineering honour society and a member of Eta Kappa Nu electrical engineering honour society. He won an honourable mention at the International Mathematics Olympiad in 1994.