

INITIAL CONDITION MODULATION CHAOTIC MODULATION SCHEME USING MAXIMUM AUTO CORRELATION ESTIMATION

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Abstract

In this paper, an efficient technique for initial condition estimation of chaotic map for M-ary initial condition modulation (ICM) scheme is proposed. This technique has been named maximum autocorrelation estimation (MACE). The proposed scheme reduces the complexity of the chaotic demodulator thereby minimizing the hardware implementation cost. Simulation results confirm that the proposed technique outperforms the traditional one which is based on inverse source chaotic equations (ISCE) regardless of modulation level value and outperforms the conventional direct sequence spread spectrum with quadrature amplitude modulation (DSSS-QAM) when high modulation level is employed. In AWGN channel and at bit error rate of 10^{-3} , the results showed that the proposed ICM-MACE schemes achieves gains in E_b/N_0 of 4 dB and 6 dB over DSSS-QAM and ICM-ISCE schemes respectively when the modulation level is 1024.

Keywords: Chaotic communication, parameter modulation, M-ary, maximum autocorrelation estimation.