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Author: Dr. Yongming Nie
China

THE SPREAD SPECTRUM AND ENCRYPTION METHOD BASED ON CHAOTIC TRUE RANDOM NUMBER SEQUENCE IN TT & C SYSTEM

Abstract

Fast physical random-number sequence generated based on chaotic oscillations in weakly coupled superlattices, which has good testability and can not be copied, will be widly potentially used in the TT C system to obtain spread spectrum and encryption. Firstly, the basic statistical properties of true random binary sequence such as balance, runs and correlation characteristics are analyzed in detail, and then a comparative analysis of the m-sequence, logistic sequence and Chebvshev sequence is given. The results show that the superlattice-based quantum wells chaotic true random number sequence has more excellent statistical properties. At last, a method for spread spectrum and encryption in TT C system based on Chaos true random number sequence is proposed, which is combning driving short code sequence with infinitely long true random sequence for encryption and decryption. The heart of the method is using the long true random sequence as the key and the driving short code is auxiliary capturing for the long true random sequence. Both theoretical analyzing and numerical simulating results indicate that the chaotic true random sequence based on quantum well superlattice structure chaotic true random number generator can be effectively applied to the field of aerospace monitoring and control, which is more secure and reliable comparing with the existing methods.