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Color Image Encryption Algorithm Based on Three-Dimensional Chaotic Economic Map

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Abstract

Color image can provide more information than gray image, so it is used more widely in the field of the communication. Protecting this image from unauthorized users, has become critical issue nowadays. In recent years, the chaos-based image encryption algorithms have attracted a lot of attention because of their dynamic behaviors. This paper introduces a new color image encryption algorithm based on three-dimensional chaotic economic map. It encrypts three channels of the image Simultaneously, in which, every channel has its own initial key. Also every initial key affects on other two channels. Therefore, in the decryption process, even an invalid initial key makes the decrypted image obscure from original image. An implementation of the proposed encryption and decryption algorithms is performed and the obtained results show that the algorithm can successfully encrypt and decrypt the color image with the same keys. The security of proposed algorithm has been verified by experimental evaluations and security analysis and shown by implementing on different types of color images. Keywords: color image, encryption, decryption, three-dimensional, chaotic economic map.