2D Sine Logistic modulation map for image encryption

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Abstract

Because of the excellent properties of unpredictability, ergodicity and sensitivity to their parameters and initial values, chaotic maps are widely used in security applications. In this paper, we introduce a new two-dimensional Sine Logistic modulation map (2D-SLMM) which is derived from the Logistic and Sine maps. Compared with existing chaotic maps, it has the wider chaotic range, better ergodicity, hyperchaotic property and relatively low implementation cost. To investigate its applications, we propose a chaotic magic transform (CMT) to efficiently change the image pixel positions. Combining 2D-SLMM with CMT, we further introduce a new image encryption algorithm. Simulation results and security analysis demonstrate that the proposed algorithm is able to protect images with low time complexity and a high security level as well as to resist various attacks. (C) 2014 Elsevier Inc. All rights reserved.

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