



# Chaotic dynamics of a semiconductor laser with double cavity feedback: Applications to phase shift keying modulation

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## Abstract

We report results on the numerical investigations of the dynamical behavior of a single mode semiconductor laser under the influence of double cavity optical feedback. We find that the system displays, under certain conditions, chaotic behaviors appropriate for chaos based communications. The synchronization of two unidirectional coupled (master–slave) systems is also studied. The influence of some parameters on the resynchronization and autocorrelation times is investigated. We find that the resynchronization time for the proposed scheme can be two orders of magnitude shorter when compared with that of the single-cavity feedback case. Very good conditions for message encoding by using the on/off phase shift keying encryption method are identified and examples of message encoding/decoding are presented.