Communication scheme using a hyperchaotic semiconductor laser model: chaos shift key revisited

ABSTRACT

Based on the Maxwell-Bloch equations, we considered a five-dimensional ODE system, describing the dynamics of a semiconductor laser. The system has rich dynamics with multi-periodic, chaotic and hyperchaotic states. In this analysis, we have investigated the hyperchaotic nature of the aforesaid model and proposed a communication scheme, the generalized form of chaos shift keys, where the coupled systems do not need to be in the synchronized state. The results are implemented with the hyperchaotic laser model followed by a comprehensive security analysis.