ICNBME 2021: 5th International Conference on Nanotechnologies and Biomedical Engineering pp 439–447

Investigation of Dynamical Properties of a Laser with Incorporated DBR Section Under the Influence of External Optical Feedback

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DOI

https://doi.org/10.1007/978-3-030-92328-0_57

Abstract

We report in this paper the results of theoretical investigations of the dynamical properties of a laser with incorporated Distributed Brag Reflector (DBR) section under the influence of external optical feedback. The adapted Lang-Kobayashi model was used to simulate and analyze the dynamics of the considered laser device. We have identified the nature of the bifurcations that occur in such a system. We plotted the Hopf bifurcation, responsible for instabilities, in the plane of different parameters. The conditions that are necessary for stable laser operation are identified. We also demonstrate the influence of the length of active region on the stability of devise emission, and show how this property is changed by variation of detuning of the mode of solitary laser.

Acknowledgment

This work was supported by the National Agency for Research and Development of Moldova within the project 20.80009.5007.08 "Study of optoelectronic structures and thermoelectric devices with high efficiency".