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Complex Dynamics of QD Light Emitting Diode with Optoelectronic Feedback

RaheemA. Jebara

Engineering College, University of Thi-Qar, Nasiriyah, Iraq

Abstract : We studied a three-variable dimensionless model for a quantum dot light emitting diode (QDLED) subject to optoelectronic feedback. In dependence of the feedback strength and delay-time we analyze complex bifurcation scenarios for the intensity of the emitted light as well as time series, FFT and phase plane of all dynamic variables in order to elucidate the internal dynamics of the light emitting diode. Furthermore, the chaotic dynamics is completely determined by both the variation of the optoelectronic feedback strength and delay-time of the QDLED, as evidenced by bifurcation diagram. Our results showed that small feedback strength lead to lower sensitivity of the light emitting towards optoelectronic feedback.

Keywords : quantum-dot light emitting diode, optoelectronic feedback, FFT, chaos, control.

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