Abstract

In this thesis a new circuit model has been developed for quantum cascade laser based on two rate equations with regard to parasitic elements and electronic derive. To effectiveness evaluation of proposed new THz QCL model simulation studies for three condition have been applied which first case is base case and second and third cases focus on changing effects of carrier lifetime and structural parameters such as coefficient gain stage on QCL operation. Numerical results show that new circuit model can evaluate dynamic and static behavior of THz QCL with high adaption of experimental laser information.

Keyword**:** Quantum cascade laser, two-level rate equations, static and dynamic behavior, threshold current, light current intensity modulation response.