

Impact of Laterally-Coupled Grating Microstructure on Effective Coupling Coefficients

Ronald Millett, Karin Hinzer, Abdessamad Benhsaien, Trevor J. Hall,
Henry Schriemer. Centre for Research in Photonics^{*}, University of Ottawa,
Ottawa, ON, K1N 6N5, Canada

Lithographic fabrication may be used to define laterally-coupled gratings of high refractive index contrast on waveguide ridges, eliminating the need for regrowth steps in such distributed feedback lasers. These may be made more amenable to fabrication by employing higher order gratings. Reliable exploration of the laser design space requires that the radiating partial waves be accurately incorporated in numerical simulations. We modify the coupled mode approach to fully consider the two dimensional cross section, analyzing rectangular, sinusoidal, triangular and trapezoidal grating shapes. Effective coupling coefficients are determined for grating orders from first to third. We show that, by tailoring the grating microstructure, effective coupling coefficients up to double that of a 0.5 duty cycle rectangular grating can be achieved.

^{*} Corresponding author. Tel. 613-562.5800x6218. FAX 613.562.5175.

Email address: hschriem@site.uottawa.ca (Henry Schriemer. Centre for Research in Photonics).