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激光器匹配驱动的色散渐变线分析

常勇, 李铮, 于强敏

北京航空航天大学 202 教研室

ANALYSIS OF TAPERED TRANSMISSION LINES FOR IMPEDANCE MATCHING DRIVING OF LASER DIODES

CHANG Yong, LI Zheng, YU Qiang min

Faculty 202, Beijing University of Aeronautics and Astronautics, Beijing, 100083, China

摘要

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摘要 论述了采用渐变线阻抗变换器对半导体激光器进行匹配驱动时, 当考虑渐变线色散影响情况的分析。给出了色散影响的概念、时域的分析计算方法及对三角形、指数形及切比雪夫渐变线的计算结果和分析。

关键词:

Abstract: In this paper, the impedance matching problem in high speed driving laser diodes is dealt with and tapered transmission lines are introduced as an impedance transformer to solve this problem. For this purpose, the authors develop a numerical algorithm. Firstly, a model of the frequency dependent effective permittivity is selected. Secondly, the voltage, current and effective power transfer functions are shown for the tapered line. And the distortion obtained by using these functions are shown for the non ideal square pulse along the exponential taper. The authors find that the relaxation oscillation in the distorted wave is caused by the dispersion of the taper. The sustained tail and descend of gentle slope in the plateau are caused due to the multi reflection in the tapered line and are inherent characteristics in the taper line. Through this numerical algorithm, results are presented for comparison of three different tapers (exponential, triangular and Chebysheff distributions). The wave response and power conversion efficiency are two factors for comparison. The results of calculation show that, by using tapered line impedance transformer, the following aspects are improved: 1. The pulse power conversion efficiency. 2. The output optical pulse waveform.

Keywords:

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