

Impact of Amplified Spontaneous Emission on the Travelling Wave Semiconductor Optical Amplifier Performance

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Abstract—The most important characteristic that affects the travelling wave-semiconductor optical amplifier (TW-SOA) performance is the amplified spontaneous emission (ASE) noise. This paper presents the SOA operation using the segmentation model that utilizes the rate equation employing the ASE noise. The impact of ASE noise on the total SOA gain response in absence and presence of input signals is investigated. Also the impact of ASE noise on SOA length for a single pulse and a packet of pulses and making comparison between them are introduced. As well as studying the dependence of gain uniformity on SOA length under the influence of ASE noise is clarified by calculating the gain standard deviation.

Keywords—*carrier density, semiconductor optical amplifier (SOA), amplified spontaneous emission (ASE) and gain response*