Abstract

Regarded as an extremity component for an optical communication chain, the photodetector plays a very significant role to detect and convert the optical ray penetrated by the optical fiber into an electric signal easier to exploit in the extraction of the information. Indeed, the noise of photodetection constitutes a precious phenomenon having several physical sources that affects the delivered signal at the output of the photodetector, focusing fundamentally on thermal noise "Johnson noise", quantum noise "Shot noise" and noise of multiplication "Multiplicative noise". This article aims to present a total study about the physical origins of fundamental photodetection noises by analyzing their behavior in PIN and APD photodiodes through an optical high debit transmission chain simulated by Optisystem software. The aim of this research extends also to evaluate and compare between PIN and APD photodiodes in function of their functional parameters in terms of performance by measurement of signal-to-noise ratio in order to characterize these photodiodes.


Index Terms

Computer Science

Signal Processing

Keywords

Optical communication simulation photodetector semiconductor PIN photodiode APD photodiode Optisystem.