Abstract

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Performance enhancement of WDM-PONs: Interferometric noise reduction

In this paper, we propose and evaluate a wavelength division multiplexing passive optical network (WDM-PON) architecture with a centralized light source (CLS). The use of only one 10 GHz band reject filter at the remote node (RN) allows WDM-PON to have a minimal value of the optical interferometric noise, which is induced by Rayleigh backscattering (RB), in the main lobe of each downstream (DS) optical signal. Utilizing this filter achieves an optical interferometric noise reduction in the upstream (US) direction and the simulation results indicate an enhancement in the performance of a bit error rate (BER) to be 10-11 and in the Q-factor to be above 6.0. Owning to the US signal modulation without extra light source, this architecture successes in power saving and efficient utilization of the wavelength.