

Abstract: Design of EDFA Gain Controller based on Disturbance Observer Technique

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Abstract

Based on a theoretical erbium-doped fiber amplifier (EDFA) model, we have proposed an application of disturbance observer (DOB) with proportional/integral/differential (PID) controller to EDFA for minimizing gain-transient time of wavelength-division-multiplexing (WDM) multi channels in optical amplifier in channel add/drop networks. We have dramatically reduced the gain-transient time to less than 30 μ sec by applying DOB with PID controller to the control of amplifier gain. The proposed DOB-based gain control algorithm for EDFA was implemented as a digital control system using TI's DSP(TMS320C28346) chip and experimental results of the system verify the excellent performance of the proposed gain control methodology.

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