Analytical Description of Chromatic Dispersion Effect on Signal Propagation in the Time Domain

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***Abstract*—The investigation of chromatic dispersion effect on pulse propagation is of interest in high-speed optical transmission systems. But the chromatic dispersion effect hasn't an acceptable analytical description in the time domain. The analytical model of the dispersion effect in the time domain using a quadratic function approximation of nonlinear part of the propagation constant and the Fresnel integrals is proposed in this paper. It is shown that the obtained model is universal and it has a tunable accuracy. A simple method of estimating the memory of an optical channel is proposed. The analytical model of signal propagation in an optical channel by means of sequential generation of pairs of echo-signals is described in the article.**

***Keyword*—Analytical model, approximation, dispersion, Frensel integrals, propagation constant, time domain, echo-signal, memory of channel**

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