

Analytical Model of Chromatic Dispersion Effect in the Time Domain

Mikhail Meltenisov *, Aleksandr Matukhin *

**The Bonch-Bruевич Saint-Petersburg State University of Telecommunications, Saint-Petersburg, Russia*
 meltenisov@gmail.com, matukhin@list.ru

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 tuneable accuracy.

Keyword— analytical model, approximation, dispersion, Fresnel integrals, propagation constant, time domain



Mikhail A. Meltenisov was born in Russia in 1989. He graduated the Bonch-Bruевич Saint-Petersburg State University of Telecommunications, Russia as the engineer at specialty "multichannel transmission systems" and as the master at area "infocommunication technologies and telecommunication systems" in 2011 and 2013, respectively. In 2013, he took a postgraduate course on specialty "systems, networks and telecommunications devices" in the same university. His studies focused on adaptive signal processing in fiber optic transmission systems.



Dr. Aleksandr Matukhin was born in 1973 in USSR. He graduated Bonch-Bruевич Saint-Petersburg State University of Telecommunications, Russia as the engineer at specialty "multichannel transmission systems" in 1996. He received Ph.D from St.Petersburg University of Telecommunication in 2004. Since 1997 he worked in St.Petersburg University of Telecommunication as assistant, senior lecturer, associate professor and chief Department of Multichannel Transmission Systems. Now he is working in St.Petersburg University of Telecommunication as Associate Professor Department of Communications Networks. His studies focused on adaptive signal processing in multichannel transmission systems.