

## **ABSTRACT**

This work presents a MATLAB simulator for amplified optical WDM systems. The simulator is based on the numeric solution of coupled nonlinear Schrödinger equations via the Split-Step Fourier Method. This simulator allows the user to study pulse propagation in optical fibers considering chromatic dispersion, nonlinear effects – self-phase modulation and cross-phase modulation – and fiber loss, foreseeing the use of Erbium-doped fiber amplifier (EDFA) too. By means of numerical simulations, the optimization of the location of an EDFA in repeaterless transmission system was explored, aiming at improving the implementation of optical communication systems by decreasing the transmitter power or the receiver sensitivity requirements. Also, this technique can lead to improved system capacity by increasing fiber either the link length or the bit rate. The results obtained with the simulator agree very well with experimental results presented in the literature, confirming the validity of the technique, as well as the versatility and robustness of the simulator.

Keywords: Numerical simulator. Amplified WDM systems. EDFA.