Cognitive Optical Networks

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Abstract
Cognitive Optical Networks is a new paradigm in the evolution of optical networks. In this network, intelligence is added to the control plane and it can observe the transmission medium and plan actions to optimize its own performance.

Key words: Cognitive Optical Networks, Elastic Networks, Dynamic Networks.

Introduction

Optical networks have evolved continuously increasing capacity and extending the reach of links. With this, the complexity of the control plane and management system has increasing significantly, being necessary to develop a software architecture highly adaptable and tailored to the demands of clients and operating autonomously, ie, with minimal human intervention. For this, it is necessary to add intelligence to the network. Conceive of such architecture is a challenge, and their achievement means a great technological advantage.

Results and Discussion

A simulation of an optical network using the the Optisystem tool was performed and is illustrated in Image 1. For this, the first step was to understand the way of operation of the Optisystem and following realize the optical network simulation. In order to be able to simulate the attenuation and distortions that occur in the optical channel, it was necessary to integrate a second tool, the Matlab, to the Optisystem. For this integration, was used a "Matlab component" block, which enables changes in the configuration and parameter values of the components of the link created by the Optisystem. Moreover, to provide intelligence to that network, a Digital Signal Processing (DSP) component was added to the system. This component processes the signal in order to improve the electrical signals of the constellation. So with a DSP the network solve the problem of recovering the signal at the network output.

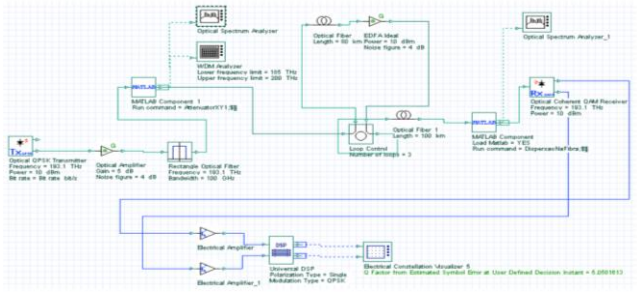

Image 1. Simulation of Optical Network with intelligent DSP element for network signal repair.

Conclusions

In order to obtain a broader knowledge in cognitive optical architectures, a study was realized of the main types of optical cognitive proposed in the literature and an optical simulation was realized using the software Optsystem. A part of this work was dedicated to the study of programming and use of the Optsystem and Matlab tools proposed in the scope of this project, as well aware a study of the major optical elements, processes, and troubleshooting techniques involved in construction of an optical network.

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