

**Master 2014**

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**Digital Nonlinear Equalization of the Fiber-Optical Channel via the  
Volterra Series Transfer Function.**

***ABSTRACT - Masterthesis***

Nonlinear impairments have been identified as a limitation in coherent optical fiber transmission. By means of the Nonlinear Schrödinger Equation (NLSE), the evolution of the optical complex envelope inside a single mode fiber can be estimated, taking into account the effect of Kerr Nonlinearities. Algorithms based on a closed form solution for the NLSE are presented in this work as options to mitigate the effect of fiber nonlinearities at the receiver side.

Integrating digital signal processing techniques inside high speed optical systems provides also a major challenges. In an effort to apply these techniques in real time systems, the development of parallel algorithms, to perform multiple operations at once, has been one of the goals of the research work in this area. Knowing this makes it easier to understand why a parallel structure was seen as an advantage, and is a common characteristic among the presented algorithms.