

# Numerical solution of 1D Nonlinear Schrödinger Equation for femtosecond laser pulse

V.N Stavrou<sup>1</sup>, Ioannis G. Tsoulos<sup>2,\*</sup> and Vasileios Charilogis<sup>3</sup>

<sup>1</sup> Division of Physical Sciences, Hellenic Naval Academy, Military Institutions of University Education, 185 39 Piraeus, Greece; email: vstavrou@hna.gr

<sup>2</sup> Department of Informatics and Telecommunications, University of Ioannina, 451 10 Ioannina, Greece; email: itsoulos@uoi.gr

<sup>3</sup> Department of Informatics and Telecommunications, University of Ioannina, 451 10 Ioannina, Greece; email: v.charilog@uoi.gr

\* Correspondence: itsoulos@uoi.gr

## Abstract

The 1D Nonlinear Schrödinger Equation (NLSE) has been employed to model the femtosecond laser pulse propagation in photonic crystals. A numerical scheme has been used to solve NLSE. Using the constructed neural network machine learning model and applying various values of time, space coordinates and applying the proper artificial boundary conditions, we have concluded that our results are close to other numerical schemes. The employed machine learning model can be applied to solve the aforementioned NLSE faster compared to other algorithms. Lastly, several numerical tests are performed to analyze the capacity of the proposed numerical scheme.

**Keywords:** Schrödinger Equation; Neural networks; Grammatical Evolution; Genetic algorithms

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## 1. Introduction

## 2. Materials and Methods

## 3. Results

## 4. Conclusions

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References

1. Author 1,

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