Associative Professorship of Line Transmission Technology
TUM Department of Electrical and Computer Engineering
Technical University of Munich

Forschungspraxis

GPU-Implementation of the Split-Step Fourier Method with CUDA

Within the scope of this thesis, the split-step Fourier method (SSFM), a numerical method solving the nonlinear Schrödinger equation (NLSE), will be implemented. The implementation has to be conducted, using the CUDA framework for parallel implementation on graphical processing units (GPUs), in the programming language C. The main focus is on reducing the computation time for the SSFM, by utilizing the massive parallel computational capabilities of GPUs. Even though Matlab can natively utilize GPU hardware for certain operations, the reduction in overall computation time is far below the expected reduction with an implementation fully written in C and called from Matlab (e.g. via Mex). Over the course of this thesis, the student will get familiar with the following concepts: split-step Fourier method, parallel programming, programming in C, CUDA, code performance optimization and evaluation.

Prerequisites

There are no special requirements needed to apply for this thesis. Still some knowledge in the following fields is beneficial: Optical Communication Systems, Basics in C programming (or basics in any other programming language), Matlab (Mex)

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Advisors

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