P.U.R.E. Research Plan Form

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Date: 9/21/2016

Fall 2016 Research Plan

Write a brief outline of your research plan:

The goal of this project is to simulate a high-speed USB-C channel, in order to study its behavior and bit-error-rate (BER). This will be done using simulation models of signals sent across the channel as well as the stochastic model of the transmission line channel itself. In order to meaningfully analyze the BER, the sending of a large number of bits across the channel are simulated, using a Monte Carlo framework. However, in the discrete time domain, the computational complexity of running Monte Carlo simulations across an arbitrarily long bit sequence is impractical. I am to investigate the possibility of compression, possibly lossy, of the simulated bit sequences. Wavelet compression, as used in many multimedia applications, will be experimented with. However, no matter the compression technique, it must be able to preserve certain characteristics of the output signal, such as its variance across many passes through the stochastic transmission line model.

What do you hope to learn and achieve by the end of the semester?

By the end of the semester, I hope to have gained familiarity with using many of the tools used in electromagnetic ad circuit analysis, such as MATLAB and Advanced Design System. In addition, I hope to gain an intuitive understanding of wavelets and other methods used in digital signal compression, analysis, and representation. Finally, I aim to develop a better understanding of the research process.

Mentee Signature: ___________________________  Date: 9/21/2016
Mentor Signature: ___________________________  Date: 9/21/2016