For the Broadband & Broadcast department in Erlangen, the Fraunhofer Institute for Integrated Circuits IIS is currently seeking Master Thesis Students or Interns for the Topic: Lattice-Reduction-Aided Equalization for High Data-Rate Cable Transmission

The Broadband & Broadcast (BB) department is active in the areas of mobile communications, satellite communications, Internet-of-Things and automotive communication systems. We take new concepts and algorithms from theory, implement them and test them in simulations and in prototypes in our labs and in the field. For instance, we operate a commercial LTE-Advanced testbed network, which we use to check the interoperability of our prototypes with the LTE standard. In short, the BB department establishes a bridge between communication theory and its employment in practice.

Abstract:
For an existing high data-rate cable transmission system we plan to enhance the currently used Tomlinson Harashima Precoding (THP) Equalization scheme using a sophisticated scheme called Lattice-Reduction-Aided equalization. This shall allow an implementation of the precoder with higher throughput and higher clock frequency. Purpose of the thesis is to devise a Matlab-based simulation in order to demonstrate feasibility and performance of the modified scheme for different cable types. The effects on synchronization and operation under non-ideal analog components shall be analyzed in detail. Possible modifications shall be proposed and simulated.

Your responsibilities:
• Understanding the principles of Lattice-Reduction-Aided equalization
• Modification of existing Matlab simulation environment
• Comparison of performance against current implementation
• Understanding synchronization and impact of non-ideal component behavior
• Optional: Adaptation of synchronization algorithms

Your profile: You …
• know the principles of equalization (DFE, THP) (mandatory)
• have detailed knowledge of Communication System Theory and operation (mandatory)
• knowledge in Matlab programming (mandatory)

What you can expect from us
• An open and cooperative working environment
• Collaboration in interesting and innovative projects
• Many opportunities to gain practical experience

The thesis will be assigned and carried out in accordance with the rules of your university. For this reason, please discuss the topic with a professor who can advise you over the course of the project. The duration for the thesis should be 6 months and it can be started from now on. The thesis will be supervised by Dr. Peter Nagel.

Interested?
Please send your application in PDF format, including cover letter, CV, latest transcripts of records, references and the date of your earliest possible start to Dr. Peter Nagel (personalmarketing@iis.fraunhofer.de) and cite ID number 565082-BBT-036.

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