Fundamentals of Signal and Power Integrity

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Signal integrity – and tightly linked with it – power integrity are highly active, cross-disciplinary topics that deal with measurement, modeling, and control of signal and power quality in all kinds of digital and analog links over wired connections. In this workshop professionals from academia and industry will introduce the audience to this field of research and present latest trends and results based on their own work. The effect of signal and power integrity issues will be shown in applications ranging from RFICs to automotive communication networks. Effective methods for assessing and improving signal integrity will be presented.

For more information on current research projects at TUHH see also [http://www.tet.tuhh.de/](http://www.tet.tuhh.de/)
Introduction
SI ⇔ PI ⇔ EMC
The basic goals of SI, PI, and EMC for an electrical system are complementary to each other.

- **SI**: insure acceptable quality of signals within
- **PI**: insure acceptable quality of power delivery within
- **EMC**: insure acceptable level of interference with the outside

![Graph showing SNR, PDN Impedance, and EMI versus Frequency]
SI/PI: A Multidisciplinary Subject

Circuit Design & Simulation
Numerical Techniques
Coupler & Filter Design
Transmission Line Theory
Network Theory
CAD Tools
System Theory
Communication Theory
HF Measurement Techniques
EM Field Theory
Electromagnetic Compatibility
EM Properties of Materials

Signal and Power Integrity
Number of publications found in IEEE Xplore containing the index terms:

“Signal Integrity“

“Power Integrity“
Workshop Overview

High-Frequency Modelling of Interconnects for Signal Integrity and EMC

Dr. Ivan Ndip, RF & High-Speed System Design Group, Fraunhofer Institute for Reliability and Microintegration IZM, Berlin, Germany

Wideband Power Isolation and Signal Balancing Topologies in HSS Interface

Prof. Jong-Gwan Yook, School of Electrical and Electronic Engineering, College of Engineering, Yonsei University, Korea

Signal Integrity Computation of Fast Automotive Communication Networks

Prof. Stephan Frei, Arbeitsgebiet Bordsysteme, Technische Universität Dortmund, Germany
Workshop Overview

**Floorplanning and Grounding Strategies for Optimal RFIC Performance**

*Dr. Jan Niehof*, Central R&D - Research / Integrated RF Solutions, NXP Semiconductors, Netherlands

**Macromodeling and its Applications to Signal and Power Integrity**

*Prof. Stefano Grivet-Talocia*, Department of Electronics and Telecommunications, Politecnico of Torino, Italy

**Modeling of Carbon-Based Interconnects**

*Prof. Wen-Yan Yin*, Center for Optical and EM Research, Zhejiang University, Hangzhou, China, and Center for Microwave and RF Technologies, Shanghai Jiao Tong University, Shanghai, China
Further Resources on the Web

- DesignCon Conference, Santa Clara: [www.designcon.com](http://www.designcon.com)
- Electronic Components and Technology Conference (ECTC): [www.ectc.net](http://www.ectc.net)
- Signal Integrity Mailing List: [www.freelists.org/list/si-list](http://www.freelists.org/list/si-list)
- EMC-Laboratory, Missouri Institute of Science & Technolog, USA: [emclab.mst.edu](http://emclab.mst.edu)
- Epsilon Group, GeorgiaTech, USA: [www.ece.gatech.edu/research/labs/hppdl/](http://www.ece.gatech.edu/research/labs/hppdl/)
- EMC-Lab, National Taiwan University, Taipei: [ntuemc.tw/index.php?node=home](http://ntuemc.tw/index.php?node=home)
- Terahertz Interconnection & Package Laboratory, Korea Advanced Institute of Science and Technology (KAIST): [tera.kaist.ac.kr/](http://tera.kaist.ac.kr/)