香港城市大學
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Centre for Chaos and Complex Networks

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Integrated Test and Manufacturing Systems Exploiting Virtual Instrumentation and Providing Traceability

Prof. Geza Kolumban
Budapest University of Technology and Economics, Hungary

Date and Time: Friday, 8 May 2009, 4:30pm – 5:30pm

Venue: Room **CD634**, Hong Kong Polytechnic University
Reception starts at 4:15pm
(Language: **English**)

Abstract

Our systems have become so complex that a huge number of calibration and test measurements have to be done during manufacturing. As an example, consider a GSM repeater that is used by the mobile service providers to assure access to the service in shielded areas such as shopping malls, restaurants etc. The results of 60 calibration measurements have to be uploaded into the memory of a GSM repeater and 20 complex measurements have to be done during the final test. The high-quality products cannot be manufactured in the conventional way any more because the end-users of these products require traceability. Traceability means that the reconstruction of the entire manufacturing/calibration/test process is made possible. The requirements of complexity and traceability cannot be satisfied if the production is based on human work and conventional quality check. A new way and philosophy of handling very complex problem are required. The key issues are the quality improvement and traceability, and not the reduction of production cost. The talk will discuss the elements of integrated test and manufacturing systems, namely (i) the traceability, (ii) virtual instrumentation and (iii) system integration. Two examples already used in the industry will be shown to illustrate the theoretical issues: (i) production of oils sensors for high-end cars and (ii) calibration and test GSM mobile phone repeaters. The talk will show a demo where after two automatic calibration steps a physical layer (PHY) implemented with the Texas TRF6900A SoC integrated circuit is turned into a spectrum analyzer.

About the Speaker: Géza Kolumbán received his M.Sc. (1976) and Ph.D. (1990) degrees from the Technical University of Budapest, his C.Sc. (1990) and D.Sc. (2204) degrees from the Hungarian Academy of Sciences, and his Dr.habil degree (2005) from the Budapest University of Technology and Economics where he is a full professor now. He is an IEEE fellow (2005) with the citation: "for contributions to double sampled phase-locked loops and noncoherent chaotic communications." After his graduation, he spent 14 years in professional telecommunications industry, where he developed microwave circuit and PLL-based frequency synthesizers. He was involved in many system engineering projects such as SCPC-type satellite telecommunication system, microwave satellite up- and down-converters, low-capacity microwave digital radio system, etc. After joining the university, he has shown that chaos exists in analog phase-locked loops, elaborated the theory of chaotic waveform communications and established noncoherent chaotic communications as a brand new research direction. He developed DCSK and FM-DCSK, the most popular chaotic modulation schemes. Two of his papers, co-authored with Profs. M.P. Kennedy and L.O. Chua, have been ranked in top-cited IEEE Trans. CAS-I articles. 63 of his publications have been cited more than 800 times by independent authors. He has been a visiting professor and researcher to the Electronics Research Laboratory, UC Berkeley, PolyU and CityU in Hong Kong, INSA-LATTIS Laboratory, Toulouse, France, University College Dublin and Cork, Ireland, EPFL, Switzerland, TU Dresden, Germany.

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