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Editorial

Vishwani D. Agrawal [1]

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This issue carries nine articles, which include two *Letters*. The topics of these articles are failure prediction, thermal considerations in test, hardware security, analog and RF testing, formal verification, power supply noise, and electromagnetic interference.

The first paper proposes a "tipping point analysis" of time series representation of component parameter data to predict system failure. The tipping point refers to a behavior that warns against an upcoming abnormal condition. The technique helps in preventive maintenance. Authors are Livina, Lewis and Wickham from National Physical Laboratory, Teddington, United Kingdom.

The second paper discusses test data compression with attention to temperature distribution on the device under test (DUT). Since the spatial distribution of temperature during test depends on the distribution of signal activity, it is beneficial to control the latter by appropriately filling don't cares in test patterns during the compression process. Contributors of this work are Arulmurugan and Balasubramaniam from Kongu Engineering College, Perundurai, Tamil Nadu, India.

Hardware security is the subject of next two papers appearing as third and fourth.

In the third paper, Su, Li, Tang and Chen, from National University of Defense Technology, Changsha, Hunan, China, address the detection of a hardware Trojan (HT) by monitoring electromagnetic radiation (EMR). Their experiments show successful detection through noise analysis of EMR. They further report problems in detecting weak Trojans due to process variation and electromagnetic interference (EMI), suggesting the possibility of detection through thermal analysis.

In the fourth paper, by Manivannan, Kuppusamy and Babu, from the Society for Electronic Transactions and Security (SETS), Chennai, India, we see the use of game theory for HT detection. The number of detection tests is kept small by focusing on low activity nodes, still the complexity remains non-trivial. The paper also gives a brief introduction to game theory and Nash equilibrium in an appendix.

Fifth and sixth papers are on testing of analog and radio frequency circuits.

In the fifth paper, Djordjevic and Pesic, from University of Nis, Nis, Serbia, present a method of fault diagnosis in linear circuits. After a test finds a set for faulty currents, faults are modeled as current sources in a system of voltage and current equations, which are then solved for faulty element values.

The sixth paper discusses the design and test of a microwave up-converter in X-band. Emphasis is given to stress screening applied to various performance parameters to qualify the device for critical operations. The contributor is Kumar from Bharat Electronics Limited, Bangalore, India.

The seventh paper discusses the verification of the error correcting code (ECC) function of a memory. The ECC is formally verified using the ACL2 system, which is a first order logic theorem prover. Authors of this work are Naseer, Ahmad and Hasan from National University of Sciences and Technology (NUST), Islamabad, Pakistan.

Next, two *JETTA Letters* complete this issue.

The first letter addresses the problem of power supply noise. When many gates in a digital circuit switch simultaneously, the heavy current causes voltage drop in power supply lines. As a result, some gates may slow down or even malfunction. A known solution is to place decoupling capacitors (decaps) close to gates. The capacitors are charged when the circuit is in steady state and then supply the switching current to gates locally. In this letter, Mitra from Brainware Group of Institutions - SDET, Barasat, Kolkata, India and Sarkar from Kalyani Government Engineering College, Kalyani, India propose novel methods of decap placement by particle swarm optimization (PSO) algorithm and sizing by another optimization procedure known as flower pollination algorithm (FPA),

✉ Vishwani D. Agrawal
agrawvd@auburn.edu

[1] Auburn University, Auburn, AL 36849, USA

The second letter is contributed by Parfenov and Chepelev from Russian Academy of Sciences, Joint Institute for High Temperatures, Moscow, Russia, and Chen and Xie from Xi'an Jiaotong University, Xi'an, China. They examine the sensitivity of electronic equipment to high energy electromagnetic pulse (EMP) and point out that the pulse repetition rate of the EMP source providing the test pulses must be greater than a lower bound that depends on the equipment under test.