



***NORTH ATLANTIC UNIVERSITY UNION***

**Editors: N. Mastorakis, V. Mladenov, Z. Bojkovic**

# **Latest Trends on Circuits, Systems and Signals**

**4<sup>th</sup> International Conference on  
Circuits, Systems and Signals (CSS'10)**

**Corfu Island, Greece, July 22-25, 2010**



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## Plenary Lecture 1

### Harmonic Identification Algorithms with Applications



#### Professor Sarawut Sujitjorn

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**Abstract:** Power quality has become more and more stringent recently due to a widespread use of switching power converters. Such devices produce an excessive amount of harmonics injected into the systems. As a result, current waveforms are distorted, and sometimes undesirable distortion occurs with voltage waveforms. Current harmonics cause an increase in heat and power losses, and a drop in power factor. These reflect an inefficient use of energy. Moreover, excessive harmonics can be harmful to protective devices, and measuring equipments. Harmonic compensations may utilize passive, active, and hybrid filters. With an active power filter (APF), probably in a hybrid form, there is a need for a harmonic identification unit sometimes referred to as a harmonic detector. The lecture will begin with the definitions of power quality, harmonics, voltage-source and current-source nonlinear loads, the need for harmonic elimination, and the corresponding standards. Consequently, a review of existing harmonic identification methods will be given. These include the PQ, the DQ, the SD, and the SWFA methods, respectively. The new harmonic identification methods developed by the speaker and his co-workers will be discussed. These include the DQF, the SVF, and the SVB methods, respectively. Various modes of applications will also be discussed. Extensive simulation results as well as practical ones for 1- and 3-phase systems will be demonstrated.

#### **Brief Biography of the Speaker:**

Sarawut Sujitjorn received his PhD in Electronic and Electrical Engineering from the University of Birmingham, UK, in 1987. He is currently a professor of electrical engineering in the School of Electrical Engineering, Suranaree University of Technology, Thailand. He has authored 3 books, and published more than 100 papers in peer reviewed journals and conference proceedings. He also holds 15 patents in electrical, electronic, and mechanical devices. For the last 15 years, he had administered the university in various positions including head of the department, vice rector for academic affairs, and director of the R&D institute. He spends his leisure time with his family, dog, garden, and Thai classical music.

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