Wednesday, September 22, 2004
8:00 AM– 12:00 Noon

(10) DESIGN METHODS FOR SWITCH-MODE POWER SUPPLIES

Tutorial Description

The intent of this tutorial is to acquaint the participants with methods used to design switch-mode power supplies (SMPS) based on use of high-frequency amorphous materials with a rectangular hysteresis loop. The following areas will be addressed:

1) Principle of operation of the magnetic switch (MS), parameters of the magnetic switch and calculation procedure for the magnetic switch;

2) Comparative analysis of transistor and magnetic switches;

3) Comparative analysis of the power supply on the magnetic switch with transistor analogs;

4) A high-efficiency non-regulated transistor inverter (500 W, 50-100 kHz) intended for joint operation with pulse voltage regulators on magnetic switches

5) A method of using high-frequency power diodes of the pulse voltage regulator on the magnetic switch that ensures an equal distribution of the load current between the parallel connected diodes of the rectifier;

6) A method of inclusion of pulse DC voltage regulators on the magnetic switch in parallel operation that ensures an equal distribution of the load current between separate voltage regulators without introduction of any additional current feedback. 7) A method of using non-regulated high-frequency inverters in synchronous and co-phased operation that ensures an equal distribution of the load current between separate inverters in the entire range of its change without introduction of additional devices in their circuitry.

Tutorial Level and Benefits

This is an intermediate level course for scientists, researchers and designers of SMPS.

About the Presenter

Dr. Volodymyr Yaskiv is Associate Professor at Ternopil State Ivan Pul'uj Technical University, Ternopil, Ukraine. He is the responsible researcher, and supervisor of the doctoral candidates, Power Management Faculty (Electromechanical Department) and Faculty of Biotechnical Systems (Department of Electronic and Computer Engineering).

Volodymyr has developed and taught the following courses**:**

- Mathematical backgrounds of electronics;
- Exploration and repair of biomedical equipment and systems;
- Control of biomedical systems;
- Backgrounds of systems theory;
- Power converters.

Dr. Yaskiv is author of 30 research projects and 50 scientific works in field of design and research of power supplies.