Prof. Ion Boldea
IEEE Fellow

May, 2005

Subject: Book Review
Title: Uninterruptible Power Supplies and Active Filters
Authors: A. Emadi, A. Nasiri, S.B. Bekiarov
Publisher: CRC Press, Florida, May 2005, 276 pp.

Electric power quality is a comprehensive concept. It refers to continuity of power delivery, symmetry of voltages, constancy of voltage amplitude, and voltage and current sinusoidality and close to unity power factor in the power source. Power electronics is used more and more to household appliances, on automobiles and for electric motion and temperature control in industry. While it reduces energy input and increases productivity, power electronics also has secondary effects in the form of voltage and current harmonics in the power supply. Fortunately it is power electronics itself that is capable to clean up the power harmonics mess and also deal with voltage sags, asymmetry and supply interruptions elimination for interruption-sensitive loads.

Uninterruptible power supplies provide power continuity in special loads (such as computers networks etc) while power filters attenuate the voltage and current power harmonics from the power source and correct the fundamental power factor.

The dynamic extension of power electronics in power systems that are becoming more and more distributed power systems makes the subject of this apparently first book on the subject, very timely.

We start by mentioning that the authors are experienced in the field and that their book makes use of an extremely rich and representative up to date literature attached to all 6 chapters.

Chapter 1 (58pp) deals with uninterruptible power supplies from classification and batteries and flywheels, to applications, parallel operation, performance evaluation, power factor correction, control aspects, PWM pertinent converters for them.

Chapter 2 (48pp) treats power filters, from harmonic sources in power systems and their effects and mitigation through applications, classifications, active filters for dc-dc converters, modeling, analysis, control and stability.

Chapters 1and 2 are the backbone of the book as they treat in an unitary way both in a panoramic view and in detail the two main subjects of the book. Chapter 3 adds to this an introduction to unified power quality conditioners which is the last trend in the field..

Up to this point the authors rely heavily on results from literature and thus the presentation is fairly representative for the world wide efforts and results in the field.

There are a few typographical errors here and there in some figures and equations which may be easily discovered and corrected by the alert reader, and which may be corrected in an eventual second edition.

Chapters 4, 5, 6 report mostly the authors contributions to the field and they are full of results from digital simulations and experiments that give the reader abilities that he looks for.

Chapters 4 and 5 contain a few single phase and three phase source reduced part count uninterruptible power supplies, and, respectively, power filters for low and medium power applications, that are treated in full detail. There are a few repetitions as some of the schemes show small differences but this should be taken to advantage by the new reader, in enforcing his (her) knowledge in the field.
Finally Chapter 6 elaborates on modeling, analysis and digital control of uninterruptible power supplies and power filters where the generalized state space averaging method and deadbeat control are mainly used and plenty of sample results are offered.
All in all we can fairly commend the authors for their efforts and results in putting together a strong monograph with visible graduate-level text book attributes in the rather new and very dynamic field of Power Electronics for Power Quality in Power Systems.
We warmly recommend the book to all electrical, electronics, automatic control engineers in R&D and in industry and to academia and students in same fields.

Ion Boldea