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Benefits of one million times larger capacitors in power electronic circuit designs: Non-traditional Supercapacitor techniques

Aula Pacinotti
Largo Lucio Lazzarino, Pisa
April, 15 – h. 11.00

Supercapacitors are almost one million times bigger capacitors, for the same package size. They come in capacitance values from 0.2 F to 70,000 F in single cell form, with very low equivalent series resistance. Circuit designers could treat these as lossless voltage droppers, large time constant circuits and high charge/discharge devices, to come up with unique circuit topologies, now known as supercapacitor assisted (SCA) techniques. Few examples are extra low frequency DC-DC converters (SCALDO), surge absorbers (SCASA), rapid heating systems (SCATMA), high density inverters (SCAHDI) and LED lighting systems(SCALED). Presentation will indicate how the simple R-C circuit can be extended to these patented techniques, to solve well known problems in electronic systems, such as efficiency issues, surge vulnerability and many others. The lecture will last around one hour.

Nihal Kularatna
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Nihal Kularatna is an electronics engineer with over 43 years of contribution to profession and research. He has authored nine books for practicing electronic engineers including the two consecutive IET Electrical Measurement Series books titled Modern electronic test & measuring instruments (1996) and Digital and analogue instrumentation- testing and measurement (2003/2008) and four Elsevier (USA) titles. His recent research monograph on surge protection systems, titled *Design of Transient Protection Systems Including Supercapacitor Based Design Approaches for Surge Protectors*, was published by Elsevier in 2018, He was the winner of New Zealand Innovator of the Year 2013 Award.

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