Title: «An Empirical Model for Runtime, Capacity and Discharge Current Relationship for Lead Acid and Lithium Batteries»

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Room XOD02 – 117, New Campus – University of Cyprus

Abstract:
Peukert’s equation describes the relationship between battery capacity and discharge current for lead acid batteries. The relationship is known and widely used to this day. This paper re-examines Peukert’s equation and investigates its validity with state of the art lead acid and lithium batteries. Experimental data reveals that for the same battery, Peukert’s exponent is not constant but it is a function of battery capacity and discharge current. This work proposes and validates a reformulated equation which provides an accurate prediction of the runtime for single discharge applications using only the battery name plate information such as capacity and the corresponding discharge time. The validation includes lead acid and lithium batteries. Finally, this work introduces and validates a methodology where the battery parameters can be determined in less than one hour when no battery data and usage is available.

Biography:
Stelios Ioannou is a member of IEEE. He was born in Nicosia, Cyprus in 1976. He received his PhD in Electrical Engineering from the University of South Florida (USF) in 2008 in the area of energy and power systems for mobile applications. He worked as a Research Associate for the Unmanned Systems Laboratory (USL) and Clean Energy Research Center (CERC) at USF, a Post Doctoral Fellow and an Associate Research Scientist for the Unmanned Systems Research Laboratory (USRL) of The Cyprus Institute (Cyl). He is currently a Special Scientist with the Department Electrical and Computer Engineering at University of Cyprus. His research interests include power and energy demand of Unmanned Ground Vehicles (UGVs) and Unmanned Aerial Vehicles (UAVs), prediction of available onboard energy, battery characterization and state of art energy storage devices including lithium, fuel cell and super-capacitor technologies. Dr. Ioannou’s research highlights include a patent, several publications, best design project award in Electronics and best presentation award.