

Improving the Behaviour of Portable Power Supply for Pulsated Loads

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Abstract- The paper deals with analysis and improving the electrical features of the voltage sources for feeding portable equipment with pulsated loads. The behaviour of several types of rechargeable batteries at load pulses is analyzed and the conditions of correct functioning in relation to the electrical stresses are settled. To improve the behavior of power supply or batteries in the dynamic regime the circuit that uses a supercapacitor connected with battery was proposed. On the basis of the experimental determinations, conclusions are drawn on the use of super-condensers in buffer system with the battery. For assessing the operation with pulsated loads, new parameters are proposed, such as: pulse rate of discharged current, batteries operation limit for a given discharge rate, and drop of the voltage pulse plateau. A Li-Ion battery - supercapacitor hybrid system is preferred over a lithium ion battery for higher rates of discharge due to the higher power density of an ultra capacitor compared to that of a lithium ion battery. Also, since the internal resistance of the super capacitor is smaller than that of the battery, the super capacitor shares the major part of the load current during high power demands, thus making the hybrid system more beneficial.