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Active voltage balancing circuit using single switched-capacitor and series LC resonant energy carrier (Article)

Ahasan Habib, A.K.M.[a], Motakabber, S.M.A.[a], Ibrahimy, M.I.[a], Hasan, M.K.[b]

[a]Department of Electrical and Computer Engineering, Faculty of Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, 53100, Malaysia
[b]Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, UKM, Bangi, Selangor, 43600, Malaysia

Abstract

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Single switched-capacitor and series LC resonant converter-based active voltage balancing circuit are presented in this Letter. This converter is proposed to balance the cell voltage in series -connected electrochemical energy storage devices namely battery or super-capacitor. This balancing circuit directly transfers the energy from higher capacitive energy storage cells to lower energy storage cells in the string. It realises the maximum energy recovery and zero voltage gap between the cells and overcomes the drawback of switching loss, conduction loss, balancing time duration, and the voltage difference between the cells of conventional switched-capacitor as well as single LC converter. The details of the balancing circuit operation, theoretical, and mathematical analysis are presented. The experimental result demonstrated that the balancing circuit result where the voltage difference is 451-0 mV in 124 min for two 12 V, 4.5 Ah lead-acid batteries. © The Institution of Engineering and Technology 2020

SciVal Topic Prominence

Topic: Battery Pack | Battery Management Systems | Equalizers (Circuits)

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Hasan, M.K.; Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia, UKM, Bangi, Selangor, Malaysia; email:mkhasan@ukm.edu.my