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A Novel High-Efficiency Compact-Size Low-Cost Balancing Method for Series-Connected Battery Applications

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This paper proposes a novel balancing method for series-connected batteries applications. The proposed method uses a transformer to couple the energy from charger or discharger to batteries for energy balancing. The proposed method has the advantages of high efficiency, compact size, suitable for any type of switching converter, load-related balancing energy, and extremely simple structure without any active switch for voltage balance function. Three converters, including a CLL converter, an interleaved non-inverting buck–boost (BB) converter, and a non-inverting BB converter, with voltage balancing function and state-of-charge balancing function are built to verify the feasibility of the proposed balancing methods.