

Multilevel converters have received more attention recently. Multilevel converters can be used not only in high-voltage high-power applications, but also in energy storage systems, thanks to reduced harmonics and electromagnetic interferences. State-of-charge (SoC) balancing of the storage system cells within cascaded multilevel inverters, e.g., batteries, can be one of the challenges in practical applications. Different methods have been studied and reported in technical literature. However, the SoC balancing is still a challenging issue. In this paper, a new method is proposed to solve this problem by applying several clever but simple changes to the staircase modulation switching scheme without changing the output waveform properties. Validations for this simple method were performed through simulation and experimental prototype. Despite the simplicity of the method, the simulation and experimental results show that SoC balancing of the cells has significantly improved.