

Abstract

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A new electronic step-up/down voltage stabilizer topology based on H-Bridge AC chopper

The rapid development and high controllability advantages of power electronic devices lead to their application in voltage stabilizers and tap-changers as competitive options with commercially available mechanical counterparts. This paper introduces a new electronic voltage stabilizer topology utilizes four AC switches in a form that may be named as "AC H-bridge" connection, and based on pulse width modulation (PWM) AC chopper combined with a single low power compensating transformer. Such topology eliminates the need of the main input multi-tapping transformer, hence reducing the overall size, weight and cost. Depending on the Selected switches and value of the chopping duty cycle, the proposed configuration is capable of stepping up down the input voltage, hence keeping the output voltage constant with continuous flow of input current and better harmonics restraining in the output load voltage. Mathematical equations describing the function of the proposed topology have been demonstrated and simulation analysis has been presented. Practical verification to confirm the capability of the setup has been illustrated through several experimental results and analysis.