

Title: A New Modular Marx Derived Multilevel Converter

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Abstract: A new Modular Marx Multilevel Converter, M(3)C, is presented. The M(3)C topology was developed based on the Marx Generator concept and can contribute to technological innovation for sustainability by enabling wind energy off-shore modular multilevel power switching converters with an arbitrary number of levels. This paper solves both the DC capacitor voltage balancing problem and modularity problems of multilevel converters, using a modified cell of a solid-state Marx modulator, previously developed by authors for high voltage pulsed power applications. The paper details the structure and operation of the M(3)C modules, and their assembling to obtain multilevel converters. Sliding mode control is applied to a M(3)C leg and the vector leading to automatic capacitor voltage equalization is chosen. Simulation results are presented to show the effectiveness of the proposed M(3)C topology.

Author Keywords: Modular Multilevel; Capacitor Voltage Equalization; Marx Modulator

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