Title: Grid Integration of Offshore Wind Farms Using Modular Marx Multilevel Converters

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Abstract: This paper proposes the use of a Modular Marx Multilevel Converter, as a solution for energy integration between an offshore Wind Farm and the power grid network. The Marx modular multilevel converter is based on the Marx generator, and solves two typical problems in this type of multilevel topologies: modularity and dc capacitor voltage balancing. This paper details the strategy for dc capacitor voltage equalization. The dynamic models of the converter and power grid are presented in order to design the converter ac output voltages and the dc capacitor voltage controller. The average current control is presented and used for power flow control, harmonics and reactive power compensation. Simulation results are presented in order to show the effectiveness of the proposed (MC)-C-3 topology.

Author Keywords: Modular Multilevel Converter; Offshore Wind Farm; dc Capacitor Voltage Equalization

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