

# A Novel Hybrid Flying-Capacitor-Half-Bridge Cascade 13-Level Inverter for High Power Applications

A novel hybrid flying-capacitor-half-bridge cascade inverter is developed in this paper. The novel inverter is based on connection of multiple single-phase flying-capacitor-half-bridge (FCH) 5-level inverter modules per phase. With the dc bus voltage ratio  $V_1:V_2=1:2$ , the phase voltage of the novel inverter with two modules per phase will output 13 voltage levels. A new hybrid FCH modulation control technique for the inverter is proposed. Spectral analysis of the phase output voltage is carried out. According to the spectral analysis, there is no real power exchange between modules in a phase leg. A two-module three-phase inverter was verified by simulation. Simulation results are presented as well as comparison with hybrid capacitor-clamp cascade multilevel converter is given.