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An Improved Fault-Tolerant Control Scheme for Cascaded H-Bridge STATCOM with Higher Attainable Balanced Line-to-Line Voltages

In this project, an improved fault-tolerant control strategy is proposed for CHB based Static Synchronous Compensator (STATCOM) under SM faults. First of all, compared with the conventional fault-tolerant method of directly bypassing the faulty SMs, the proposed fault-tolerant method takes advantage of the healthy switches of the faulty SMs, where they are still able to generate either positive or negative voltage level. As a result, more output voltage levels can be generated, and it raises the attainable balanced line-to-line voltage, especially when different fault types exist at the same time. Then, based on the specific condition of OC fault or SC fault, when the output voltage reference of the faulty phase reaches its limit, the references of the other two healthy phases are redistributed to generate the desired line-to-line voltage. With the reconfiguration of modulation waves, the attainable balanced line-to-line voltage can be further improved. In addition, the proposed fault-tolerant method possesses the ability of cluster voltage balancing, which is an important issue for the STATCOM application. Simulation results validate the effectiveness of the proposed fault-tolerant method.

Domain: Power Systems _ Hybrid Systems

Technology: Electrical