

Improvement Issues on Input Filter Design for PWM-CSR

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Abstract: Pulse width modulated Current-Source Rectifiers (PWM-CSR) modulated with Selective Harmonic Elimination (SHE) are frequently used in medium voltage AC drives in high power. The filter requirements are usually satisfied using a low-pass LC input-filter. Damping resistor that is connected in the capacitive branch is necessary to avoid two unwanted oscillation sources, (a) the transient response of the filter to a sharply sloping edge in the rectifier-input current and (b) the amplification of non-characteristic harmonic presents in the rectifier input currents near to the filter-resonant frequency. As a result of adding the resistors, it is necessary to increase the filter size in order to keep the harmonic attenuation by degrading the dynamic system response and increasing the filter cost. The proposed solution is to modify the capacitive branch to obtain a smaller filter than using the standard topology. Practical considerations and necessary equations are exposed in a detailed procedure to design the proposed filter. Simulated results are presented to validate the theoretical hypothesis.