HARMONIC STUDY OF CYCLCONVERTER: SINGLE PHASE AND THREE PHASE COMPARISON

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ABSTRACT

Harmonics is a sinusoidal components of a periodic wave or quantity having a frequency that is an integer multiple of the fundamental frequency. Harmonics are caused by non-linear loads, which are loads that draw a non-sinusoidal current from a sinusoidal voltage source. Some examples of harmonic producing loads are electric arc furnaces, static VAR compensators, inverters, DC converters, switch-mode power supplies, and AC or DC motor drives. High levels of harmonic distortion can cause such effects as increased electrical equipment heat such as transformer, and thus shorter the device's life span. It is important to study on the harmonic that occurs caused by the non-linear loads such as cycloconverters. Cycloconverters are commonly used as AC to AC converter, which is more on converts an AC waveform, such as the mains supply, to another AC waveform of a different frequency. Due to fast switching during the operation, the cycloconverters can produce harmonics. This thesis shows the simulation of cycloconverters in different pulse. There are four cycloconverter used which are two single phase cycloconverter (2pulse), three phase cycloconverter (3pulse), and lastly three phase cycloconverter (6pulse). The method of controlling the gate pulse generator is phase control or delay angle control method. This multi-pulse cycloconverters is design and simulated using engineering software, Matlab and Simulink and one single phase cycloconverter is constructed at lab. The advantage of study different pulse of cycloconverter is to find a good and reliable cycloconverter with fewer harmonics.

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