Abstract

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Solar energy is a good renewable energy. Because solar energy is clean and we can find it in everywhere. Solar energy can convert to electricity by using solar cells. However, solar cells can generate only direct current power. Therefore, we need to develop an inverter for converting direct current power to alternate current power. In present, the inverter technology in Thailand needs much more developments. This development supports the growth of the domestic industry in the future.

The objective of this project has studied and developed the fuzzy logic control of predictive current control system for 3 kW single phase inverter which has Total Harmonics Distortion (THD) in line current lower than 5%. This inverter is used to connect solar cells into utility grid. This development uses program MATLAB with SIMULINK and Fuzzy Logic Toolbox to simulate the control system for the single phase inverter in theoretical aspects to increase the efficiency of control system and reduce calculations time for control system. This project has simulated the inverter to compare the inverter current of fuzzy logic current control to predictive current control and hysteresis current control. The simulation results have shown that fuzzy logic current control give the same performance with predictive and hysteresis current control. However, since the fuzzy logic current control requires less complex mathematical operations than predictive current control. So that it can use cheap micro-controller as controller instead of using expensive microprocessor.