Evaluation of Maximum Power Point Tracker (MPPT) to increase efficiency of photovoltaic power systems

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EE5290 Spring 2009

Abstract – In the past few years, energy crisis has become a serious issue worldwide. Renewable and sustainable power sources such as solar, wind, and biomass have become the alternative to combat the energy crisis and protect the environment. This paper proposes a Maximum Power Point Tracking (MPPT) converter to optimize the efficiency of a photovoltaic power system. A low cost, and high efficiency controller as the Maximum Power Point Tracker is a DC-DC power converter that is located between the photovoltaic module and the batteries (load) to obtain the most energy from the source. Different climate conditions are a challenge because they change the output current and voltage characteristics on a Photovoltaic module. The MPPT control module has been designed to track the maximum power point under different weather conditions by controlling the output current and voltage from the PV-module in order to increase the power transferred to the battery bank. The design concept of a MPPT is presented in more detail along with simulations to validate the implementation of the MPPT in a small scale photovoltaic system.

About the presenter
Luis Tomioka: Currently pursuing a M.S in Electrical Engineering at Michigan Tech. He received his B.S in Electrical Engineering from Michigan Tech in Fall 2007. Work experience includes an engineering Co-Op at NewPage Corporation in Wisconsin Rapids, Wisconsin as a mill engineer. Also, a summer internship at Delphi Steering in Saginaw, Michigan. Areas of interest include controls and power.