Modelling and optimisation of stand alone power generation at rural area

ABSTRACT

Hydroelectric power is one of the important renewable energy sources. It converts the potential energy of the natural circulating water flows to usable electrical energy by driving a turbine which is connected to a generator. In the rural area of Sabah state in Malaysia, such as Kampung Terian, the existing micro-hydro power plant is incapable to support the villagers' demand during the peak hours. Meanwhile, the tremendous amount of excess energy is wasted by disposing through ballast load during the non-peak hours. Since the discharge coefficient parameter of charging system is dynamically changed in nature, the conventional proportional controller is unable to control the charging process well. Thus, a lead-acid battery storage system is developed to incorporate with the micro-hydro power plant. Fuzzy logic control is proposed in this work to control the amount of current charging for the battery by manipulating the duty cycle of a DC-DC buck converter.