

## **Maximizing power generation in variable speed Micro-hydro with power point tracking**

### **ABSTRACT**

Conventional variable speed micro-hydro control systems suffer from non-optimal input control. The controllers estimate the changes in flow rate without anticipating the global maximum power curve. As such, this paper aims to explore and develop a feasible maximum power point tracker (MPPT) with perturb and observe (P&O) and genetic algorithm (GA) in providing optimal power generation for variable speed micro-hydro system. This research first introduces a mathematical model for an experimental variable speed micro-hydro platform and then simulates the microhydro in MATLAB. Conventional P&O MPPT algorithm used fixed perturbation size which requires large computation time when the perturbation size is small and suffers from power fluctuation issues when the perturbation size is large. Thus, a GA-based P&O MPPT algorithm with adaptive perturbation size is proposed to provide a large perturbation size during transient response and a small perturbation size at a steady state. The simulation results showed that the proposed GAbased P&O MPPT algorithm was able to track the global maximum power point (MPP).