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# Investigation into the steady-state load sharing of weak sources in a low voltage three-phase islanded microgrid

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# ABSTRACT

This research investigates the power sharing between distributed energy resources with voltage and frequency droop control. A case study based on voltage sources in an islanded microgrid is set up in the laboratory, referred to as: The Example Microgrid. The Example Microgrid consists of two synchronous generators, active and reactive power loads.

A simulation model is constructed based on the laboratory set-up, where component-wise and system-wise testing are completed. The simulation results are validated with the experimental set-up, and it is concluded that the model accurately represents the physical system under steady-state conditions. Further simulation studies on conventional droop controllers are conducted based on the Example Microgrid model. The results indicate that the use of conventional droop control is inappropriate for small, low-voltage islanded microgrids.

As a possible application of this work, three variations of adapted droop controllers are simulated and their performance evaluated. It is found that with the adapted droop controllers, the power sharing error can be minimised.