THESIS INFORMATION

Title:	**Adaptive Control of Parallel Operation Inverters in Microgrids**
Major:	E**lectrical engineering**
Major code:	**62.52.02.02**
PhD student:	**PHAM THI XUAN HOA**
Advisors:	**Associate Prof. Dr. LE MINH PHUONG**
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Contributions of this thesis

This thesis presents a power sharing control method for use between paralleled three-phase inverters in an islanded microgrid based on the online line impedance estimation by the use of a Kalman filter. In this thesis, the mismatch of power sharing when the line impedance changes due to temperature, frequency, significant differences in line parameters and local loads have been solved to enhance the accuracy of reactive power sharing in an islanded microgrid. Communication is used to facilitate the tuning of adaptive controller for the change of load. The method will ensure in accurate power sharing even if the communication is interrupted. If the load changes while the communication is interrupted, the sharing accuracy is reduced, but the proposed method is better than the conventional droop control method. In addition, the accuracy power sharing base on the proposed method is not affected by the time delay in the communication channel. A control model has been simulated in Matlab/Simulink with inverters connected in parallel for different ratios of power sharing. The simulation results and experimental results demonstrate the accuracy of the proposed control method.

(1) The theoretical results

The thesis "Adaptive Control of Parallel Operation Inverters in Microgrids", the author has made a scientific contribution to the field of power control in Microgrid as follows:

1. The controller was adapted to perform the power sharing according to the rated power of the inverters, without affecting the line impedance and local load.
2. The thesis has made Kalman measurement and filtering method for line impedance follow real time.
3. The thesis has demonstrated the responsiveness of the proposed controller to the influence of local loading.
4. The thesis has proposed a solution for increasing the accuracy of the power sharing and the reliability of the proposed controller when the communication was delayed or interrupted.

(2) Experimental results

During the study, the author has designed an experimental model consisting of 2 and 3 parallel inverters with capacity abouth 3kW as follows:

1. The thesis has presented in detail the design and construction of the model.
2. The model has reached the standard for quality of voltage (EN 50160 standard).
3. The power sharing and measurement line impedance was specified base on the DSP 28335.
4. Experimental results are consistent with theory and simulation results.

Advisors	**PhD student**
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