

Master-Thesis

Knowledge-based Control of Load Frequency in Microgrid System using Reinforcement Learning

Proper selection of controller parameters is one of the important considerations when designing controllers for an engineering system. For PID and its variants controllers, for example, these parameters (K_p , K_i , and K_d) are selected by trial and error through the in-depth experience of the controller designer. Though studies have shown the effectiveness of this approach for small-scale systems in the past, the multidimensionality of today's engineering systems has called for an automated and optimal means of designing controllers. One such multidimensional system is the microgrid system, which is a localized power grid that can operate collaboratively with other grids or independently in islanded mode. This master thesis will develop a knowledge-based PI controller for the frequency control of multi-area microgrid systems using deep reinforcement learning model. This will be achieved by carrying out the following task.

Student tasks:

- * Literature review on microgrids and various optimized controllers designed for LFC in microgrid systems.
- * Develop a PI controller for the frequency control of the microgrid system.
- * Obtain the optimal parameters of the PI controller using reinforcement-learning model.

Student Profile:

- * Master student in Electrical Engineering or Control Systems
- * Experience with MATLAB scripting and Simulink modeling
- * Fundamental knowledge of control theory and power systems.
- * Basic knowledge of AI / Neural Network

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