عنوان مقاله:

Interval Type-II Fuzzy H∞ Frequency Control for an Island Microgrid

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خلاصه مقاله:

Frequency control is one of the key parts for the arrangement of the performance of a microgrid (MG) system. Theoretically, model-based controllers may be the ideal control mechanisms; however, they are highly sensitive to model uncertainties and have difficulty with preserving robustness. The presence of serious disturbances, the increasing number of MG, varying voltage supplies of MGs, and both independent operations of MGs and their interaction with the main grid makes the design of model-based frequency controllers for MGs become inherently challenging and problematic. This paper proposes an approach that takes advantage of interval Type II fuzzy logic for modeling an MG system in the process of its robust H∞ frequency control. Specifically, the main contribution of this paper is that the parameters of the MG system are modeled by interval Type-II fuzzy system (IT2FS), and simultaneously MG deals with perturbation using H∞ index to control its frequency. The performance of the microgrid equipped with the proposed modeling and controller is then compared with the other controllers such as H2 and μ-synthesis during changes in the microgrid parameters and occurring perturbations. The comparison shows the superiority and effectiveness of the proposed approach in terms of robustness against uncertainties in the modeling .parameters and perturbations

کلمات کلیدی:

Frequency Control, H∞ Index, Interval Type-II Fuzzy Logic, Microgrids, Uncertainty