A method for the design of UFLS schemes of small isolated power systems

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Abstract-

This paper presents a systematic method for the design of robust and efficient underfrequency load-shedding (UFLS) schemes. UFLS schemes play an important role in protecting the system integrity. The systematic method consists first in selecting representative operating and contingency (OC) scenarios by means of a clustering algorithm and subsequently, in tuning UFLS cheme parameters by dint of a simulated annealing optimization algorithm. The approach is applied to a small isolated Spanish power system. The systematic method leads to a robust and efficient UFLS scheme. The resulting design is also compared to a design based on OC scenarios determined by the common practice of OC scenario selection. The possibility of rearranging UFLS stages and the influence of minimum allowable frequency constraints is analyzed as well. Finally, an analysis of the impact of increasing converter-connected generation (CCG) is presented.

Index Terms- Design methodology, frequency stability, load shedding, power system protection.

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