ELECTRA REX

A Researcher Exchange Programme for Smart Grids

European Liaison on Electricity Committed Towards long-term Research Activity Integrated Research Programme

SMS-VIR (STUDY, MODELING & SIMULATION OF VIRTUAL INERTIAL RESPONSE)

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I. SUMMARY OF THE PROJECT

This project investigated the frequency stability in power systems, which is highly correlated to the inertial response of the system since any inequality in system´s power balance causes a variation in the kinetic energy of the rotating masses and thus a change in frequency.

In this framework, the main objective of this project was the general implementation of emulated inertia response and fuzzy logic controllers with virtual inertia in power systems for the stabilization of the frequency by diminishing fast deviations under step load changes or during continuous fluctuations in the electrical grid.

II. MAIN ACHIEVEMENTS

The following figures (Fig. 1 & 2) illustrate the contribution of fuzzy controller with virtual inertia and simply the virtual inertia response against classical frequency control. The disturbances being considered are for a step load changes of 1% and the implementation of a continuous fluctuation onto the system respectively. As it was anticipated, fuzzy logic control and emulated inertia improve the system´s dynamic response during the aforementioned disturbances when the system´s total inertia is reduced by half.

III. DISSEMINATION PLANNING

1) Special Session at EDST Conference- Experiences from the ELECTRA IRP Researchers Exchange
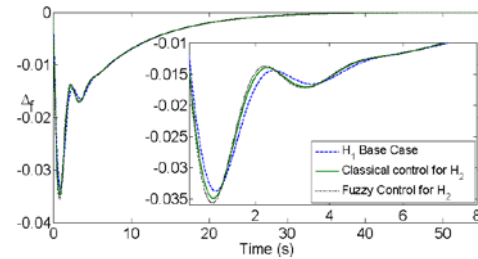2) Paper Submission to a peer reviewed journal

Fig. 1. Fuzzy and classical control strategies´ contribution to frequency support (1% step load change).
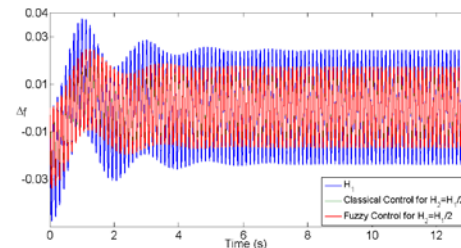

Fig. 2. Fuzzy anc classical control strategies´ contribution to frequency stability (continuous fluctuation).