

# **Abstract**

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## **Heuristic Optimization of Supplementary Controller for VSC-HVDC/AC Interconnected Grids Considering PLL**

This paper presents a new approach to enhance the dynamic responses of AGC in power systems by means of heuristic optimization of VSC-HVDC supplementary controllers. The upcoming power electronics-based VSC-HVDC transmission systems offer new features that would be advantageous for improving the frequency control and thus for enhancing the stability of the transmission grids. In this paper, the parameters of the proposed control modulation are tuned using Genetic Algorithm and Simulated Annealing methods. The performance of the proposed intelligent based tuning approach is assessed through MATLAB simulations for an AC/DC interconnected system. For the sake of detailed analysis, the effects of PLL and frequency measurements are also included in the VSC-HVDC system modeling. Furthermore, to show merits of the proposed strategy, a comparison between AC and DC transmissions is presented.