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Enhancement in Load Frequency Control of Multi Area Hydro Thermal System with HVDC Tie-line Incorporation under WCA based TIDN Controller

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Kambhupati Venkata Govardhan Rao ; Malligunnta Kiran Kumar ; B. Srikanth Goud ; Ch. Naga Sai Kalyan ; Harish Pulluri ; M. Venkatesh All Authors

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Abstract



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Abstract: This paper put an effort to develop the tilt-integral-derivative plus filter (TIDN) for frequency regulation of interconnected power systems (IPS). Multi-area thermal-hydro (MATH) system is chosen and a step load disturbance (SLD) of 10% is laid on area-1 for the assessment of the dynamical analysis. A water cycle algorithm (WCA) is implemented to optimize the developed TIDN controller whose efficacy is showcased with other control techniques. MATH is perceived with communication time delays (CTDs) to analyze its practical nature. The high voltage DC (HVDC) tie-line is further integrated with the MATH system to obtain performance enhancement.

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I. Introduction

In realistic practice, the electric power generation by the electric utility companies is concerning the existing load demand as it is not possible to store power in bulk quantity. The momentary variations in load demand will be met by the variations in alternator mechanical input. The imbalance in load and supply on the electric utility companies is directly indicated by the frequency. The power imbalance will be compensated through the governor's action and the secondary controller and then the frequency might attains new value. The restoration of frequency is done by the secondary regulator through the change of alternator set-point. The alternator set-point must be varied automatically by the load frequency controller (LFC) [1].

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