

## Article Abstract

<b>Title:</b>	<b>Overall performance evaluation of evolutionary designed conventional AGC controllers for interconnected electric power system studies in a deregulated market environment</b>
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<b>Abstract:</b>	<p>Electric power industry is currently in transition from vertically integrated utilities to an industry that will incorporate competitive companies. This increases the complexity of the load frequency issue and calls for more insight and research. In this context, the tuning of a multi-area automatic generation control (AGC) system after deregulation and furthermore, the effect of reheat turbines dynamics in the power system performance, are not yet discussed in depth and are studied in this work. The effect of bilateral contracts on the dynamics of the system is taken into account and the concept of DISCO participation matrix for these bilateral contracts is simulated. Genetic algorithms are adopted in order to obtain the optimal parameters of the load-frequency controllers as well as of the frequency biases of thermal systems with reheat turbines. Also, since the optimum parameter values of the classical AGC have been obtained in the literature by minimizing the popular integral of the squared errors criterion (ISE) only, an effort is made in this study to show that this criterion does not give always the best system performance especially in a deregulated environment. In this work, we investigate the optimum adjustment of the load frequency controllers using a set of performance indices which are various functions of error and time. In this way, someone can observe the various performances that such a kind of power system might have when a different performance index is used. It should be noted that to the extent of the authors' knowledge, this kind of optimization has not been done yet in the literature. The performances of the tuned two-area AGC system are obtained using appropriate Matlab/Simulink models. Finally, it is envisaged that the synthesis procedure highlighted in this paper could be of practical significance for tuning conventional AGC controllers for an interconnected thermal-electric power system in a deregulated environment.</p>
<b>Keywords:</b>	AGC, load frequency control, power systems, deregulation, bilateral contracts, genetic algorithms

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