عنوان مقاله:

Toward Smart Power Grids: Communication Network Design for Power Grids Synchronization

محل انتشار:

بیست و هفتمین کنفرانس بین المللی برق (سال: 1391)

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خلاصه مقاله:

In smart power grids, keeping the synchronicity of generators and the corresponding controls is of great importance. To do so, a simple model isemployed in terms of swing equation torepresent the interactions among dynamics of generators and feedback control. In case of having a communication networkavailable, the control can be done based on the transmitted measurements by the communication network. The stability ofsystem is denoted by the largest eigenvalueof the weighted sum of the Laplacian matrices of the communication infrastructure and power network. In thiswork, we use graph theory to model the communication network as a graph problem. Then, Ant Colony System (ACS) is employed for optimum design of abovegraph for synchronization of power grids. Performance evaluation of the proposed method for the 39-bus New England powersystem versus methods such as exhaustive search and Rayleigh quotient approximation indicates feasibility and effectiveness of our method for even large scale smart power grids.

کلمات کلیدی:

Ant Colony System (ACS), communication network, Laplacian matrix,smart grid, swing equation

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