

Congestion and Price Prediction under Load Variation

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In market-based planning and operation, it is always useful to have the information of generation dispatch, congestion and price as load increases. Therefore, it is very beneficial to system planners if the congestion or LMP versus load is readily available. This can certainly be obtained by repetitively running an optimization model at different load levels. However, this approach is too brute-force to be practical. In this paper, an efficient algorithm is proposed to identify the new binding constraint and the new marginal unit set when the system load increases from the present load level. It addresses the challenge of step changes in generation dispatch when a generation or transmission limit becomes binding. The algorithm also gives the new sensitivity of the new marginal units. Therefore, the generation dispatch, congested lines, and LMP at a new critical load level (CLL) can be easily calculated. Test results are presented in matrix formulation to clearly demonstrate and verify the proposed algorithm. Since the proposed approach is based on linearized model, it should be particularly suitable for short-term planning or operation, although application to long-term planning is also possible.