A Polyhedral-Based Approach Applied to Quadratic Cost Curves in the Unit Commitment Problem

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Resumen

This paper presents a new polyhedral approximation for the quadratic cost curve of thermal units for the unit commitment problem. The approximation is tight, can be represented by rational numbers, and its size grows logarithmically with respect to the required precision. In addition, the scalability is improved compared to the direct resolution of the quadratic problem involved, due to the linear mixed-integer formulation. On the other hand, the particular structure of the unit commitment problem guarantees that the solution of the mixed-integer linear formulation proposed is an epsilon-optimal of the original problem. This property allows the direct comparison of the proposed approximation with the original formulation. In most cases, analyzed results indicate that the proposed approach has the best performance compared to other formulations where the bounds of the quadratic cost function are known.

Palabras clave

Palabras clave de autor: Mixed integer linear programming; polyhedral approach; quadratic cost function; thermal unit commitment
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