Improving the B&B search for large-scale hydrothermal weekly scheduling problems

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Abstract-

This paper presents an optimization based algorithm to solve the weekly scheduling problem of a large-scale hydrothermal power system, formulated as a mixed-integer linear programming model (MILP). The main drawback of the MILP approach is the high computational burden required to solve large-size problems. The proposed algorithm tackles this problem by providing an initial feasible and integer solution, which enhances the search of the Branch and Bound (B&B) over the space of feasible solutions, reducing the resolution time. A detailed representation of thermal, pumped storage, and hydroelectric units is considered, taking into account the net head dependence of hydro plants by means of an underrelaxed iterative process. The presented algorithm has been applied to real-scale study cases, obtaining satisfactory results in computational time and optimality.

Index Terms- Large-scale hydrothermal scheduling; Head dependent reservoirs; Mixed-integer linear programming

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