A two-stage constructive heuristic algorithm to handle integer investment variables in transmission network expansion planning

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Comparison of NLP runs

Table 1 presents a comparison between the number of non-linear programming problems solved in the scope of the proposed methodology and in the algorithms published in literature that use classical integer non-linear optimization [1], for some of the systems studied here. The number of solved NLP problems was selected as a comparison metric since this number strongly determines the computation effort. After analyzing both the computational effort and the quality of the solutions, it is possible to conclude that the proposed heuristic strategy is a promising tool and presents valuable advantages. In other words, it is capable of providing good quality final solutions while requiring low computational effort when applied to medium and large scale systems, which is one of the difficult tasks inherent to constructive heuristics from literature.

Table 1

Number of NLP runs - Losses neglected.

Transmission Network	Proposed Methodology	Literature (Branch-and-Bound) [1]
South-R	$70,2M **373 NLP**	$70,2M **379 NLP**
South-WR	$154,4M **1075 NLP**	$154,4M **8081 NLP**
Col-P3	$647,8M **887 NLP**	$560,0M **40797 NLP**

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References

[1] M.J. Rider, A. V. Garcia, R. Romero, Transmission system expansion planning by a branch-and-bound algorithm, IET Generation, Transmission and Distribution. 2 (2008) 90–99. https://doi.org/10.1049/iet-gtd:20070090.