A novel meta-heuristic model for the multi-year transmission network expansion planning

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The fast construction times of projects based on variable generation technologies (VGTs) such as photovoltaic and wind generation, together with growing difficulties for building new transmission lines due to socio-environmental requirements, have opened new challenges in the development of sustainable power systems. Due to the complexity of the Transmission Network Expansion Planning (TNEP) problem, current models are usually oversimplified and do not always meet the requirements needed for the practical application. Examples of these simplifications are the use of reduced network equivalents, limiting the planning horizon to one or a few years and limiting the expansion options to adding new lines in given corridors. To meet the new challenges and achieve a time-effective increase of the transmission capacity for the integration of VGTs, improved models and algorithms capable of taking into account a higher degree of detail in the TNEP problem are needed. In this a