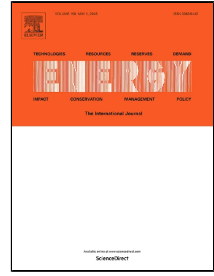


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Gravitational search algorithm applied to fixed head hydrothermal power system with transmission line security constraints

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Gravitational search algorithm applied to fixed head hydrothermal power system with transmission line security constraints

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Highlights:

- GSA is a strong algorithm with a stable structure.
- STHCP is a complicated problem with a wide search space.
- Electrical and hydraulic constraints have been provided by punishment function.
- Line losses were calculated using the Newton-Raphson load flow method.
- GSA produces better solutions compared with the algorithms in the literature.

Abstract

Optimal operation and production planning are important problems for electric power generation systems. Optimal operation of an energy generation system conventionally refers to the minimization of total thermal fuel cost (TTFC). However, the presence of thermal and hydraulic generation units in a power system requires that hydraulic as well as thermal constraints be added to a problem, which is referred to as a short term hydrothermal coordination problem (STHCP). STHCPs assume that the amount of water in the reservoirs of a hydraulic generation unit has no effect on power generation when its net heads are fixed. This study applied a gravitational search algorithm (GSA) for the solution of a STHCP with fixed head. The probable electrical and hydraulic constraints of the problem have been provided by punishment function method. Line losses of the power system were calculated using the Newton-Raphson

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