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Frequency stabilization in an isolated wind-diesel system using ISA-based PID controller

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In this paper, a PID controller designed for frequency stabilizing in an isolated wind-diesel power system and tuning of PID controller gains, formulated as an optimization problem and solved using Interior Search Algorithm (ISA). In order to prove the performance of proposed method, four cases of simulations are assumed, step change in load of diesel side, step change in wind speed, random changing of the diesel side load and random changing of the wind speed. Also, performance indices like overshoot, undershoot, settling time, ITAE and ISTSE are calculated and compared with Bee Colony (BC) algorithm. Results show that the proposed method is very robust and effective.

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MVMO-solution approach for optimal location and sizing of dynamic VAr sources

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Traditional options to deal with voltage problems include: Under voltage load shedding, which constitutes a slow control approach and may be unable to address fast dynamics; the upgrading or addition of transmission lines which both involve significant investment and installation time and installation of fixed shunt capacitors which may fail to address short-term voltage problems. Alternatively, the addition of flexible AC transmission systems (FACTS) is taken into consideration. The static synchronous compensator (STATCOM), as FACTS element based on voltage source converter (VSC) technology, provides almost instantaneous and continuous voltage support. Aspects of power quality, desirable footprint and improved reactive power contribution under depressed voltages subsequent to severe disturbances make STATCOM generally an attractive candidate for mitigating short-term voltage problems. Significant research has been devoted to the problem of dynamic VAr planning in steady-state regime. There is nevertheless no assurance that obtained solutions entail enhanced performance implications in dynamic terms. For optimization problem dealing with power system dynamic performance, the associated complexity lies in the discontinuous, multimodal, non-convex solution space. Classical techniques do not lend themselves to acceptable outcomes, even though these are computationally efficient. In departure from the state of the art, this presentation overviews an integrated meta-heuristic optimization framework for simultaneous determination of optimal allocation and sizing of dynamic Var sources (ODynVarS). Considering multiple pre-selected contingencies in the decision making, the mean-variance mapping optimization (MVMO) is adopted and adapted to tackle the underlying problem complexity.

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