Electrical Power and Energy Systems[☆]

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Abstract

Providing reliable energy is a major force in shaping the economic welfare of a developing country. For a power utility in such a country one of the key focus areas is the planned preventative maintenance of the power generating units in its power system. The celebrated *generator maintenance scheduling* (GMS) problem is the problem of finding a schedule for the planned maintenance outages of generating units in a power system. A novel tri-objective model formulation is proposed for the GMS problem. The first (and most commonly adopted) objective involves minimising the squared reserve levels, which serves to create an even ("reliable") margin of generating capacity over and above expected demand. The second objective involves the production cost associated with a maintenance plan for the generating units in a system, where planning maintenance on a power generating unit which is cheap to operate during a high demand period will incur a higher production cost. The third objective involves the risk (on expectation) of generating units breaking down, where the longer the time period since the last maintenance service of a generating unit, the larger the risk of it breaking down. The solutions to this GMS problem, *i.e.* maintenance plans, may be used by decision makers within a national power utility.

Keywords: Generator maintenance scheduling, Simulated annealing, power system, reliability

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References

[1] R. Feynman, F. Vernon Jr., The theory of a general quantum system interacting with a linear dissipative system, Annals of Physics 24 (1963) 118–173. `doi:10.1016/0003-4916(63)90068-X`.

[2] P. Dirac, The lorentz transformation and absolute time, Physica 19 (1-12) (1953) 888–896. `doi:10.1016/S0031-8914(53)80099-6`.