A Software-Based Tool for the Reliability Evaluation of a Utility's Generation Capability

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Abstract

Analytical reliability evaluation analyses can be broadly categorised into two main areas, namely static or long-term and spinning or short-term evaluation. The paper presents a PC-based Windows application software for evaluating the static reliability indices of practical power systems using the well-established generation inadequacy probabilistic techniques. The name given to this software which was developed using MATLAB 5.3 is Reliability Evaluation Tool (REST). The effects of the addition of energy limited systems to existing conventional power systems are also incorporated into the package. The two approached for static evaluation; the loss of load and the frequency/duration have been applied to three power system configuration models. The algorithms for the building of the generation model, i.e., the capacity outage probability table (COPT), equivalent assisting and tie-constrained models are also implemented as well as the algorithms for the convolution of load and capacity models. REST was tested using two reliability test systems, namely the IEEE Reliability Test System (RTS) and the Roy Billinton Test Systems (RBTS). Selected results of the software using both test cases are presented in this paper for illustration purposes.