This thesis presents a method for evaluating reliability indices and the interrupted energy rates (IER) in generation systems using the equivalent load and equivalent capacity table method.

The reliability indices can be calculated by convolving a generation model with a load model. In this thesis, a round-off technique for a generating unit model is developed. With the proposed technique, a generating unit capacity will be modified into the chosen step size of a MW increment and all types of indices, i.e., loss of load probability (LOLP), frequency & duration (F&D) and expected unserved energy (EUE), can be calculated. In this case, the cumulative state load model derived from an hourly load curve is employed.

The interrupted energy rates can be calculated by using the same method as reliability calculation but the individual state load model derived from a daily load curve is used instead. Then the IER is used to evaluate the optimum reserve capacities in generation systems.

A computer program is developed for the calculation of reliability indices and interrupted energy rates, and tested on 3 systems, i.e., a small size RBTS system, a medium size IEEE-RTS system, a large size Electricity Generating Authority of Thailand (EGAT) system. With the proposed technique, the results demonstrate that reliability indices can be obtained with a shorter computation time than the conventional methods whereas the accuracy is still very satisfactory.

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