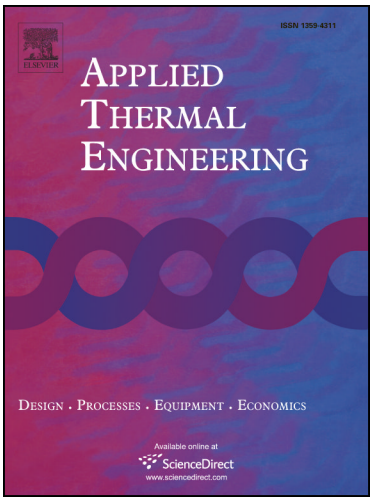

Industrial waste heat: Estimation of the technically available resource in the EU per industrial sector, temperature level and country

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New procedure for determination of availability and reliability of complex cogeneration systems by improving the approximated Markov method

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Abstract:

There are two procedures to solve reliability problems: analytical techniques and stochastic simulation. Each has advantages and disadvantages. One of the important analytical techniques for repairable systems is the Markov method. This method uses state space to consider all states that may occur. To use this method for complex systems, the model of the system must be simplified. For this purpose, many states are removed from the space state. In this way, although the probabilities of the states are calculated, these probabilities are often not accurate. In the present work, a new approach is proposed that considers both the simplified system and the calculation of the probability of each state accurately. The new method can calculate the probabilities by taking into account minimum states. Site utility systems are used to illustrate the procedure for applying this method. Site utilities have several repairable components (e.g. steam turbine, gas turbine, HRSG, de-aerator, boiler). So, this system can generate a large and complex state space for which it is difficult to calculate the probability. The new procedure can reduce the number of states and aggregates of the exploded state space due to the high number of components. The results show that the new procedure can predict state probabilities with high accuracy.

Keywords: Utility systems, Reliability, Availability, Space State, Markov Model