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HIERARCHIES OF DESCRIPTION OF ENERGY SYSTEMS

The author considers one of the most important tasks to be tackled in the course of modeling of processes or phenomena, that is, identification of the degree of detail of a description. It is also applicable to energy systems and their efficiency. This task has a particular significance as any researcher needs to attribute names to the system elements and their states. This discussion originates from the basic provisions of the Ashby principles and fundamentals of the modeling of information systems in the realm of generalized states, or situations. A model should take a proper account of the fact that some information is lost whenever more detailed level of description is replaced by the less detailed one. Thus, the task consists in the hierarchical description of functioning systems. We introduce the hyper-system model to solve this task.

The mathematical theory set forth in the paper proves that any losses of information about some object are inevitable whenever the level of description is changed. One may see new logical and mathematical problems arising in this field. For example, there is still no answer to the question how "deep" we can advance in our studies of hierarchical systems.

Key words: energy systems, modeling of energy efficiency, level of description.

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