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Physical and mathematical basis for decision making using weather and climate information for the energy sector

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Decision Making (DM) problem is of great practical value in many areas of human activities. Most widely used DM methods are based on probabilistic approaches. Well-known Bayesian theorem for conditional Probability Density Function (PDF) is a background for such techniques. It is due to some uncertainty in many parameters entered in any model described functioning of many real systems or objects. Uncertainty in our knowledge might be expressed in alternative form. I o er to employ appropriate con dential intervals for model parameters instead of relevant PDF. us one can formulate a prior uncertainty in model parameters by means of a set of linear constraints. Related cost or goal function should be de ned at corresponding set of parameters. at leads us to statement of problem in terms of operational research or mathematical linear programming. It is more convenient to formulate such optimization problem for discreet or Boolean variables. Review of relevant problem statements and numerical techniques will be presented as well as several examples. e house heating and a condition optimal strategies responded to di erent IPCC climate change scenarios for some domains of Russia are considered Evolving of climate and energy costs should be taken into account in building construction design. Optimal relationship between future expenses for house heating and costs of new house constructions including material costs and its amounts a subject of discussion. In both considered tasks DM might be performed by means of the discreet optimization algorithms. If the DM variables are all required to be integers, then the problem is called an Integer Programming (IP). e 0-1 IP is the special case of integer programming where variables are required to be 0 or 1 (rather than arbitrary integers). e IP is a most convenient form for decision maker use. e 1 value means that a given scenarios is accepted, the 0 value means that given scenarios is rejected. To illustrate suggested approach the branch and bound technique was implemented to surface a temperature Ensemble Predictions System (EPS) for northern parts of Russia. Aim of this illustrative research was to link the EPS output facility to requirements of particular forecast users.

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