

Problem of discrete-continuous optimization of heat networks and possible approaches to their solution

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The report considers the problem of optimization of hydraulic modes of heat supply systems (HSS) based on economic criteria for the structure running pumping equipment.

Solving this problem inhibited by factors of: HSS high dimensionality, nonlinearity flow distribution model, discrete search area on the structure of equipment, the simultaneous presence of continuous control methods, etc. So there are currently no workable methods or software systems that are suitable for practical use.

The report examines the issues of adaptation to existing HSS in ESI SB RAS basis in calculation methods acceptable and optimal modes of pipeline systems [1]. Consider a new formulation of the problem consists in determining the number of pumps running at the pumping station. It meets the requirements of uniformity of the pump on HSS in their parallel operation and gives a considerable gain in computational complexity.

To select the optimal composition of pumps connected proposed four methods: exhaustive search method, discrete branch and bound method, branch pruning method, continuous branch and bound method. These methods assume directed search options. In the optimization of each option for continuous variables is performed by internal points [2, 3].

These methods are implemented in the form of research programs and tested on a model of HSS. Computational experiments demonstrate the effectiveness of continuous branch and bound method.

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