PURPOSE AND OBJECTIVE OF THE COMPUTER AIDED SYSTEM OF WATER ENGINEERING

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Water's situation in Russia and all over the world each year escalates. Indeed, an important federal issue is to assure the access of any country population to drinking quality water. The water engineering knowledge of high-tech industries is also a problem on a national scale for environmental safety and resource efficiency.

Some research topics, under analysis also in foreign countries, applicable to water and sanitation [1, 2] are: environmental conditions assessment and improvement, study of water treatments for all kinds of water sources, evaluation of human caused environmental pollution and toxicology (for drinking water). The results of these studies are regularly published in high impact factor journals (Water Research); this confirms their high relevance.

The state of the art in the field of water engineering, including water treatments, has several outstanding issues:

lack of automated water quality check systems; lack of potential mathematical models for water treatment technologies to be used in optimization tasks; lack of ill-conceived methodologies for an effective technology selection for each potential water-supply source; lack of ill-conceived model predictive control methodologies for processes with complex dynamics (multi-stage processes possessing nonlinear control channels).

The current work is focused on the problem area named "Computer Aided Water Systems Engineering". The planned tasks to be investigated are: advanced researches on in-plant, recycling, efficient and environmentally-friendly water treatment technologies, in the area of water quality control; the development of a model predictive control method for processes with complex dynamics; the scouting and comparison of existing water-energy nexus technologies by means of detailed process-energy system simulations; the development of optimization methods for the definition of the optimal layout in complex multi-stage processes.

REFERENCES

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