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Sustaining Power Resources through Energy Optimization and Engineering

Pandian Vasant and Nikolai Voropai

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Sustaining Power Resources through Energy Optimization and Engineering

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Mathematical Modelling of the Thermal Process in the Aquatic Environment with Considering the Hydrometeorological Condition at the Reservoir-Cooler by Using Parallel Technologies

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ABSTRACT

This paper presents the mathematical model of the thermal power plant in reservoir under different hydrometeorological conditions, which is solved by three dimensional Navier - Stokes and temperature equations for an incompressible fluid in a stratified medium. A numerical method based on the projection method, which divides the problem into four stages. At the first stage it is assumed that the transfer of momentum occurs only by convection and diffusion. Intermediate velocity field is solved by fractional steps method. At the second stage, three-dimensional Poisson equation is solved by the Fourier method in combination with tridiagonal matrix method (Thomas algorithm). At the third stage it is expected that the transfer is only due to the pressure gradient. Finally stage equation for temperature solved like momentum equation with fractional step method. To increase the order of approximation compact scheme was used. Then qualitatively and quantitatively approximate the basic laws of the hydrothermal processes depending on different hydrometeorological conditions are determined.

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