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MODELING TASK FOR THERMAL PROCESSING OF OIL-SLIME

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This article presents the numerical method for solving the heat equation and modeling of the

thermal processing of oil slime. That modeling is very relevant because of the need to solve the environmental problems of large contaminated areas with oil slime. The concept of modeling is quite
complex, it includes a huge variety of ways to represent objects and processes. In this research work,
mathematical and numerical modeling was used, and the solution is performed using modern programming language such as C , also result is given with used of implemention of visualization
technologies.

Keywords: oil sludge, numerical modeling, mathematical modeling, thermal processing, the heat equation.

Nowadays, Kazakhstan is one of the leading countries in the production and processing of oil and oil products. But along with the growth in oil production, increase in the volume of its processing
and transportation problems are exacerbated ever-increasing utilization of oil pollution and other toxic waste. Why the decision of these problems is important for the international community? The
main reason for that oil refineries and enterprises cause enormous damage to the environment and
thereby violate the ecological system of our entire planet[1].

Mathematical and numerical modeling for thermal processing of oil-slime. Let us consider heating a layer of oil-slime with a stream of hot air. The process is two-dimensional, non-stationary,
the values of the flow velocity are assumed constant. We solve the problem in a rectangular region.

The mathematical model of the process is described by the equations of heat and mass transfer. In
numerical analysis, the Alternating Direction Implicit (ADI) method is a finite difference method for
solving parabolic, hyperbolic and elliptic partial differential equations.[2] It is most notably used to
solve the problem of heat conduction or solving the diffusion equation in two or more dimensions.

Afterwards, result is taken in graphical form with used visualization technologies. It can be shown
that in the two-dimensional case the scheme of variable direction method is absolutely stable. The
advantages of the method of alternating directions include high accuracy, because the method is exact
in second-order.

The aim was to develop of thermal processing oil-slime with numerical methods in order to protect the environment and natural resources. Nowadays, the most of the major issues that concern
societies are concentrated in the field of environmental protection. Solid, liquid and gaseous waste
generated in the production after rejections have a harmful effect on both the natural components of
the air, and on soil and water. This is extremely dangerous for living organisms and is a threat to the
health of future generations. The set goals were achieved.

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