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**GEOMETRICAL PARAMETER MEASUREMENT
AND PHYTOPLANKTON PROCESS MODELING
BASED ON VIDEO IMAGES OF WATER SAMPLES FROM RESERVOIRS**

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Abstract: *There was developed a computerized system for measuring the geometric parameters and the number of phytoplankton instances in the water samples from reservoirs used for household purposes. The basis of these measurements is formation and computer processing of video images of water samples from these reservoirs. The measurement results are used to develop the mathematical models of phytoplankton processes, monitoring and forecasting of the status of reservoirs for household purposes, which are a source of water supply.*

Keywords: *geometrical parameters, measurements, video images, polynomial model, phytoplankton.*

1. Introduction

Phytoplankton development in reservoirs is one of the major environmental problems. The most intensive phytoplankton development occurs in reservoirs and other bodies of water used for household purposes with limited water circulation. The result of this process is a significant degradation of potable water quality and a significant increase in the total amount of toxic substances in water.

To monitor and forecast these processes, it is required to determine the number of instances and biomass of phytoplankton in 1 dm³ of water and identify the same by species. This can be done by taking water samples from reservoirs, placing these samples in a microscope with a digital camera, with subsequent generation and computer processing of phytoplankton video images. Thus, the basis for biomass identification and determination are geometric parameters characterizing the size and shape of each phytoplankton instance.

Therefore, the development of measurement tools for phytoplankton geometric parameters and its development process modeling is a relevant scientific and technical problem.

2. Analysis of existing research and publications

The issue of measuring the geometric parameters of objects at video images is highlighted in a number of papers of the prominent scientists [1 - 11]. However, these studies are lacking information about the measurement of phytoplankton geometrical parameters based on algorithmic processing of video images containing the metering information about these

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