

On the Structure of the Urban Air Pollutant Monitoring System

I. V. Stepanchenko, V. A. Kamaev

Kamyshin Technological Institute (Branch) of Volgograd State Technical University, Kamyshin; Volgograd State Technical University, Volgograd

Key words and phrases: dispersion model, environmental monitoring, identification method, mobile measurement, pollutant, two-layer structure.

Abstract: The authors described an approach to the organization of environmental air monitoring in cities with safe environmental conditions and low pollution.

The main idea is to abandon the fixed network measuring parameters of atmospheric air. The mobile control system replaces the fixed network measuring parameters. The error of the mobile control is minimized by a special structure of the monitoring system and mathematic methods.

The approach involves the creation of a two-layer system of air monitoring. The system involves creating an upper-layer system to solving the following tasks: estimated of the pollutants dispersion in the atmospheric surface layer; real-time diagnosing areas in which possible elevated levels of pollutants; planning of the mobile monitoring actual values of surface pollutants concentrations; estimated emissions from stationary sources; real-time definition environmental constraints to the subsystems enterprises control. The lower-layer solves the following tasks: mobile control of pollutants concentrations in the atmospheric surface layer; initiation of the upper-level decision-making.

In the paper, we described a list of the models for the air environmental monitoring system of the city. There description of the model the pollutants dispersion in the atmospheric surface layer was presented. The description of the model of vehicle emissions was made. The method of remote identification of emission sources was described. The formulas and criteria of optimization algorithm were described. The simple method of gradient descent was used.