

INFORMATION TECHNOLOGIES IN THE EVALUATION ENVIRONMENT

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Abstract

Destabilization of the ecosystem is defined by the name ecological stress. The methods of the formation and solution of algebraic equation systems by matrix are used in the solution destabilization of the ecosystem. Analysis of the selected environment elements can be performed by using information technologies and mathematical methods.

Key words: ecosystem, environment, measure of the destabilization of the ecosystem.

1 Introduction

Emissions of the toxicants which are released into the air cause not only current but will also cause problems in the future, which include for example the air of a low quality, global warming, climatic changes, destruction of buildings and constructions, erosion of ozone in atmosphere. Emissions represent the amount of the toxicants which is released into the air from stable or mobile sources of the destruction.

Stable or mobile sources can be the sources of the destructions. The stable source are represented by technological units, storage houses or dumps of fuel, raw materials and products, waste dumps, quarries or other areas where scald, burning or outlet of toxicants is possible, or buildings, premises, devices and activities of with combustion engine or with any other driving engine, which destruction the air.

2 Measure of destabilization in ecosystem explicitly

The ecological stress is defined by the impacts on the environment x_i , $i = 1, 2, \dots, k$, such as exhaust emissions, noisiness, dustiness, oil products, vibrations, asbestos, denser traffic, sewerage water, solid waste and other.

Into the set of impact sources belong for example internal traffic, external traffic, electric machine operation, own construction and other. The most frequently observed elements of the environment are the air - A , soil - S , water - W , green - G , energetic agency (light, noise, radioactivity etc.) - E , infrastructure (electricity and water supply, an impact on a city infrastructure, traffic deterioration) - I , aesthetics - U . These elements form a subset which is represented by vector

$$C = (A, S, W, G, E, I, U) \quad (1)$$

Changes in the set of the observed elements of the environmental define the measures of environmental damages (MED)[1], [2].

Then, regarding the selected elements it is possible to form a matrix which defines the changes

$$\overline{M}_{ED} = (\overline{M}_{EDA}, \overline{M}_{EDS}, \overline{M}_{EDW}, \overline{M}_{EDG}, \overline{M}_{EDE}, \overline{M}_{EDI}, \overline{M}_{EDU})^T \quad (2)$$

The sets of the factors which represent agencies on the ecosystem and on the environment will be expressed by vectors in the multidimensional (n – dimensional space).

3 Ecological stresses in the ecosystem

The emission matrix expressed by matrix $\bar{E}$ and which is formed by components E_{ij} , $i = 1, \dots, m$, $j = 1, \dots, n$ represents the emission level in the complex of the impacts on the ecosystem $(a_1, a_2, \dots, a_m)$ from the sources $(z_1, z_2, \dots, z_n)$ where we denote the matrix of the agencies in the ecosystem as

$$\bar{A} = (a_1, a_2, \dots, a_m)^T \quad (3)$$

We work with sets of equations using the standard algebraic methods or using information technologies, mathematics programmers. The solutions are in approximation of the ecosystem damages and provide the source for suggestions of the environmental improvement[3],[4],[5].

4 Conclusion

The air is one of the elements of the environment the protection of which is extraordinarily important, because when the air is contaminated, the spread of toxicants cannot be practically stopped. When the air is contaminated a person or corporation which caused contaminated can be sanctioned according to the act dealing with air protection [6],[7],[8].

The level of the air destruction is rated according to the criteria on the basis of which the admissible level is determined. The criteria include emission limits, general provisions premises operation, national emission quotas and emission quotas. The sanctions are imposed for air destruction most frequently the sanctions have the form of financial fines, which apply both for corporations and natural persons authorized for enterprise which operate large, medium and sources of the air destruction where the provisions imposed by law are respected. On the regional level it is important to mention control stations [9],[10],[11]. Manual control station were replaced by the automatic ones, which perform pollution control and provide information about progress in the time and about extremes in temporal concentrations of toxicants in the air[12],[13],[14],[15].

Information technologies record the state of the environment in the critical regions. Up till the information technologies were not used for the observance but only for the data processing.

5 Literature

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