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METHOD OF MODELING OF MOTOR VEHICLES HARMFUL EMISSION CONCENTRATIONS DISTRIBUTION USING CLUSTERING AND INTERVAL ANALYSIS

The article is devoted to the problem of displaying and prediction of the concentrations of harmful vehicles emissions. They can be constructed based on the results of sample observations of dynamics with known limit error measurements. The article contains the formulation of the problem, mathematical model of stationary and non-stationary fields of harmful emissions concentration for the environment state control, modified method of subtractive clusterization and its application.

The method for building of model of harmful motor vehicles emission concentrations distribution taking into account the intensity of traffic flow is proposed. As the basis, mathematical model was chosen in the form of a difference operator, which is an analogue of the diffusion differential equation with partial derivatives. To obtain a uniform grid of a difference operator, the cluster analysis of the spatial distribution of the traffic flow intensity was used. For the difference operator identification, the structural identification based on the interval data analysis was proposed.

This approach will ensure the uniform coverage of the whole grid with discrete parts equal to the radius of the cluster. At the same time, at the points of the grid, the intensity of the traffic flows (units per hour) corresponds to a value that is associated with the value of the center of the cluster in which the given node hits.

Keywords: *mathematical modeling, clustering analysis, interval analysis, interval difference operator, harmful motor vehicle emissions, vehicular traffic.*

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МЕТОД МОДЕЛИРОВАНИЯ РАСПРЕДЕЛЕНИЯ КОНЦЕНТРАЦИЙ ВРЕДНЫХ ВЫБРОСОВ АВТОТРАНСПОРТА С ИСПОЛЬЗОВАНИЕМ КЛАСТЕРНОГО И ИНТЕРВАЛЬНОГО АНАЛИЗОВ

Предложен метод построения модели распределения концентраций вредных выбросов автотранспорта с учетом интенсивности автотранспортного потока. За основу выбрана математическая модель в виде разностного оператора, который является аналогом диффузионного дифференциального уравнения в частных производных. Для получения равномерной сетки разностного оператора использован кластерный анализ пространственного распределения интенсивности автотранспортных потоков. Для идентификации разностного оператора предложено использование структурной идентификации на основе анализа интервальных данных.

Ключевые слова: *математическая модель, кластерный анализ, интервальный анализ, интервальный разностный оператор, вредные выбросы автотранспорта, автотранспортный поток.*