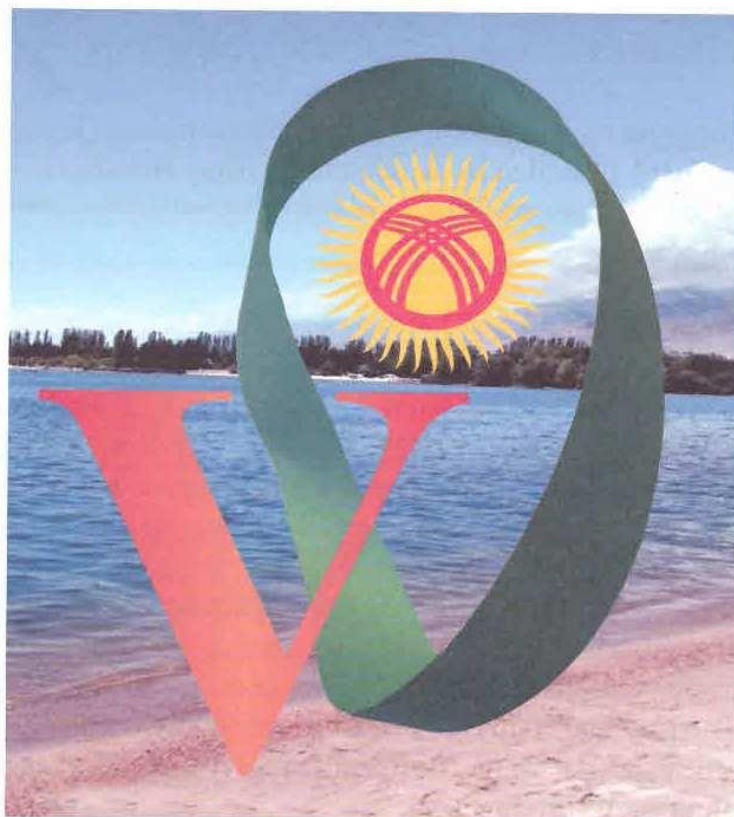




V CONGRESS OF THE
TURKIC WORLD MATHEMATICIANS

Kyrgyzstan, Issyk-Kul, 5-7 June, 2014



ABSTRACTS

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STUDY OF THE DEVELOPMENT OF THE ATMOSPHERIC PROCESSES OF THE INDUSTRIAL CITY, TAKING INTO ACCOUNT PHOTOCHEMICAL TRANSFORMATIONS

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To study the influence of anthropogenic heat sources, pollutants and heterogeneity of the underlying surface to the atmosphere of an industrial city in the three-dimensional region a model of the atmospheric boundary layer of the following form [1, 2, 3] is considered.

equations of motion:

$$\frac{\partial u}{\partial t} + \frac{\partial u^2}{\partial x} + \frac{\partial uv}{\partial y} + \frac{\partial u\omega}{\partial z} = -\frac{\partial \pi}{\partial x} + lv + \frac{\partial}{\partial z} \left(\nu \frac{\partial u}{\partial z} \right) + \Delta u, \quad (1)$$

$$\frac{\partial v}{\partial t} + \frac{\partial uv}{\partial x} + \frac{\partial v^2}{\partial y} + \frac{\partial v\omega}{\partial z} = -\frac{\partial \pi}{\partial y} - lu + \frac{\partial}{\partial z} \left(\nu \frac{\partial v}{\partial z} \right) + \Delta v, \quad (2)$$

$$\frac{\partial \omega}{\partial t} + \frac{\partial u\omega}{\partial x} + \frac{\partial v\omega}{\partial y} + \frac{\partial \omega^2}{\partial z} = -\frac{\partial \pi}{\partial z} + \lambda \theta + \frac{\partial}{\partial z} \left(\nu \frac{\partial \omega}{\partial z} \right) + \Delta \omega, \quad (3)$$

continuity equation under the assumption that the spatial and temporal changes of density are insignificant:

$$\operatorname{div} \vec{U} = \frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial \omega}{\partial z} = 0, \quad (4)$$

equation of heat flow:

$$\frac{\partial \theta}{\partial t} + \frac{\partial u\theta}{\partial x} + \frac{\partial v\theta}{\partial y} + \frac{\partial \omega\theta}{\partial z} + u(S \frac{\partial \delta}{\partial x} + \theta_x) + v(S \frac{\partial \delta}{\partial y} + \theta_y) = \frac{\partial}{\partial z} \left(\nu \frac{\partial \theta}{\partial z} \right) + \Delta \theta, \quad (5)$$

In order to consider the transformations of harmful impurities at transferring the technique proposed in [4] is used. To simulate photochemical processes fifteen most common types of harmful substances such as CH_2O , CO , CO_2 , SO_2 , SO_3 , HSO_3 , NO , NO_2 , NO_3 , HNO_3 , MgO , CaO , H_2SO_4 , $MgSO_4$, $CaSO_4$ and chemical reactions between them has been chosen.

transport equation and photochemical transformation of pollutants:

$$\frac{\partial \varphi_q}{\partial t} + \frac{\partial u\varphi_q}{\partial x} + \frac{\partial v\varphi_q}{\partial y} + \frac{\partial \omega\varphi_q}{\partial z} = \Delta \varphi_q + \frac{\partial}{\partial z} \left(\nu \frac{\partial \varphi_q}{\partial z} \right) + \alpha_q \varphi_q + \beta_q + f_q, \quad (6)$$

$$\sum_q \varphi_q = 1.$$

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