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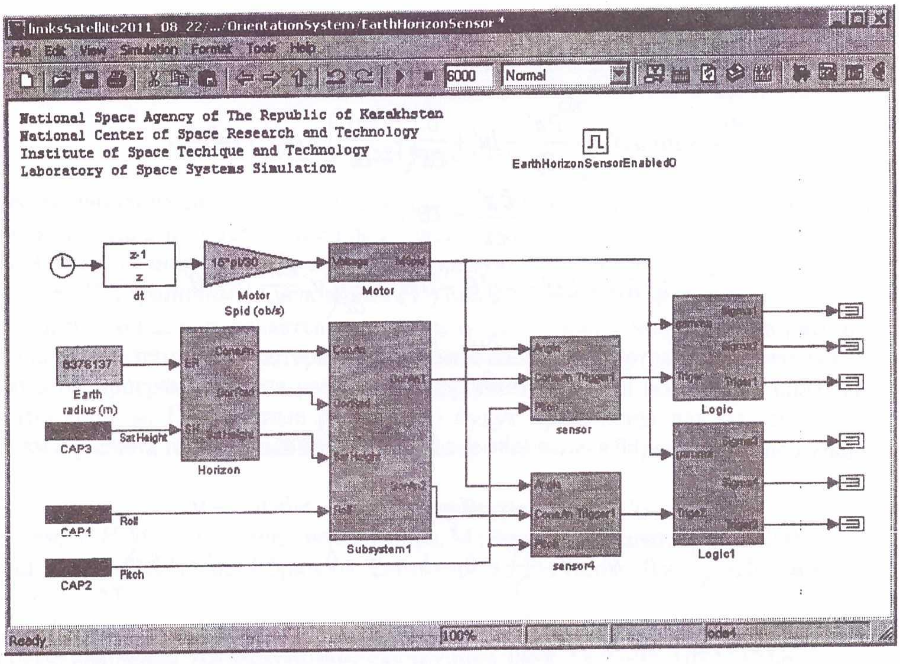

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Figure 1. Simulink-diagram of horizon sensor simulation model

Results of modeling of the sensor operation at the time of determining of the Earth's horizon are presented in this paper.

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DETERMINATION OF URBAN AIR POLLUTION AND SIMULATING THE SCATTERING OF HARMFUL IMPURITIES

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In this paper, the spatial non-stationary atmospheric boundary layer equations based on a system of equations in the perturbations, which are solved by the method of splitting into physical processes. We present a set of applications designed for the simulation of pollutant dispersion from vehicles and industrial plants in the ambient air of the city. Depending on the characteristic spatial scales of investigation of transport processes of diffusion and developed various types of models [1]. The basis for the physical description of the atmospheric boundary layer similarity theory is chosen Monin-Obukhov and the empirical function of [2]. The system of equations for a layer located above the surface is chosen in the following form [1]:

$$\frac{\partial u'}{\partial t}+div\vec{u}\,u'=-\frac{\partial\pi'}{\partial x}+l\upsilon'+\frac{\partial}{\partial z}\left(\nu_{u}\frac{\partial u'}{\partial z}\right)+\Delta u'+\lambda\delta_{x}\theta',$$
$$\frac{\partial\upsilon'}{\partial t}+div\vec{u}\,\upsilon'=-\frac{\partial\pi'}{\partial y}-lu'+\frac{\partial}{\partial z}\left(\nu_{u}\frac{\partial\upsilon'}{\partial z}\right)+\Delta\upsilon'+\lambda\delta_{y}\theta',$$
$$\frac{\partial\pi'}{\partial z}=\lambda\theta',$$
$$\frac{\partial\theta'}{\partial t}+div\vec{u}\,\theta'+S\omega'=-u'\tilde{\theta}_{x}-\upsilon'\tilde{\theta}_{y}+\frac{\partial}{\partial z}\left(\nu_{\theta}\frac{\partial\theta'}{\partial z}\right)+\Delta\theta',$$
$$\frac{\partial u'}{\partial x}+\frac{\partial\upsilon'}{\partial y}+\frac{\partial\omega'}{\partial z}=0,$$

Initial-boundary conditions for the system take the following form:

$$u'=0,\ \upsilon'=0,\ \omega'=0,\ \theta'=0,\ \varphi=\varphi_{0}\quad when\ \ t=0,$$
$$u'=0,\ \frac{\partial\upsilon'}{\partial y}=0,\ \theta'=0,\ \frac{\partial\varphi}{\partial y}=0\ \ when\ \ y=0,\ y=\mathrm{Y},\ 0\le x\le\mathrm{X},$$
$$\frac{\partial u'}{\partial x}=0,\ \upsilon'=0,\ \theta'=0,\ \frac{\partial\varphi}{\partial x}=0\ \ when\ \ x=0,\ x=\mathrm{X},\ 0\le y\le\mathrm{Y},$$
$$u'=0,\upsilon'=0,\theta'=0,\omega'=0,\pi'=0,\nu\frac{\partial\varphi}{\partial z}=0\ \ when\ \ z=\mathrm{H},$$

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ЧИСЛЕННОЕ МОДЕЛИРОВАНИЕ РАБОТЫ СОВРЕМЕННЫХ ВЕТРОТУРБИН (В ЧАСТНОСТИ КАРУСЕЛЬНОГО ТИПА)

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В этой работе приведена разрабатываемая математическая модель для исследования взаимодействия ветротурбины карусельного типа “Дарье” со стационарным воздушным потоком [1-5] на основе уравнений Навье-Стокса.

Математическая модель воздействия стационарного воздушного потока со скоростью “u” на вращающуюся ветротурбину «Дарье» (радиусом r_0) с угловой скоростью ω описывается стационарными уравнениями Навье-Стокса и неразрывности [1-3], и имеет следующий вид:

$$\begin{cases}u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}=-\frac{1}{\rho}\frac{\partial p}{\partial x}+\frac{1}{Re}\left(\frac{\partial^{2}u}{\partial x^{2}}+\frac{\partial^{2}u}{\partial y^{2}}\right)+\frac{1}{\rho}R_{x},\\ u\frac{\partial v}{\partial x}+v\frac{\partial v}{\partial y}=-\frac{1}{\rho}\frac{\partial p}{\partial y}+\frac{1}{Re}\left(\frac{\partial^{2}v}{\partial x^{2}}+\frac{\partial^{2}v}{\partial y^{2}}\right)+\frac{1}{\rho}R_{y},\\ \frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}=0\end{cases}$$