

It is possible, even that it is one of the components of biological struggle, capable to restrain the number of other invasive insects such as a locust, which is a favorite food for a mantis.

This allows making an assumption about a possible role of mantises in a complex of measures on the biological methods of a control in enclosed spaces, including greenhouses.

#### BIBLIOGRAPHY

1. *Sergeeva, T. P.* Faunal analysis of orthopterans (Orthoptera) in Belarus / T. P. Sergeeva // Fundamental problems of entomology in the 21st century: materials of the International scientific conference, St. Petersburg, 16–20 May, 2011 / SPb: Publishing house of the St. Petersburg University. – SPb, 2011. – P. 150–152.
2. Problem of alien species in the fauna and flora of Belarus / V. Semenchenko // Science and innovations. – 2006. – No. 10 (44). – P. 15–20.
3. *Fasulati, K. F.* Field study of terrestrial invertebrates. – Moscow: Higher school. – 1961. – 304 p.
4. Alien invasive species of animals in Belarus [Electronic resource] / Database and network monitoring. – Mode of access: <http://www.ias.by>. – Date of access: 21.08.2016. Specially protected natural territories of Belarus. Research. Issue – Minsk: Belarusian Press House, 2008. – 152 p.

### THE APPLICATION OF A NEW SOFTWARE FOR 3D MODELING OF THE NONISOTHERMAL HEAT AND MOISTURE TRANSFER IN NATURAL DISPERSE ENVIRONMENT

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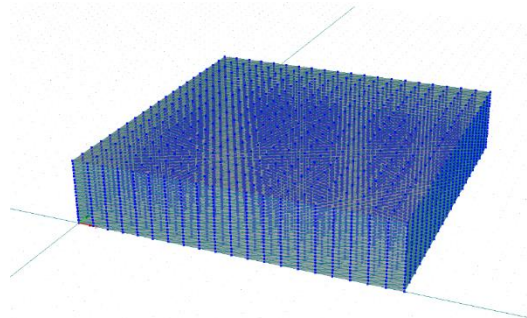
With the help of the developed software tools on the basis of modern parallel computing technologies and computer graphics, the results of 3D modeling of nonisothermal heat and moisture transfer [1] in natural disperse media were obtained using the example of simulation of temperature changes in the soil.

*Keywords:* 3D Modeling, Heat Transfer, Heat and Moisture Transfer, Pollutants Migration, Parallel Computing, Software Application, FEM, Tetrahedral Finite Elements

To apply the new software the simulation of temperature changes [2] in the soil layers with the following initial parameters will be held:

- dimensions of the calculation area are: 10000×10000×2000 mm;
- number of soil layers: 3 (from top to bottom: loam – layer thickness 800 mm, silty loam – layer thickness 400 mm, sand – layer thickness 800 mm);
- upper layer temperature is 15 °C;
- the temperature of the lower layer is 20 °C;
- the simulation period is 30 days in 6-day increments [3].

To perform the task we should first construct a finite element model of the computational domain (*Figure 1*) with the tetrahedron as the final element [4].



*Figure 1 – Finite element tetrahedral grid*

After the input data is entered into the program calculations should be performed. The results are shown [5] on *Figure 2*.

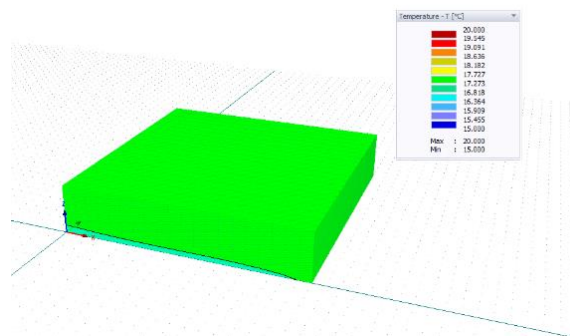


Figure 2 – Results of 3D modeling of temperature changes in soil after 30 days

## BIBLIOGRAPHY

1. Кундас, С. П. Компьютерное моделирование миграции загрязняющих веществ в природных дисперсных средах / С. П. Кундас, И. А. Гишкелюк, В. И. Коваленко, О. С. Хилько; под общ. ред. С. П. Кундаса – Минск: МГЭУ им. А. Д. Сахарова, 2011. – 212 с.

2. *Shalkevich, P. K.* Methods of long-term forecasting of the nonisothermal heat and moisture and pollutants migration in natural disperse environment using parallel computing technologies / P. K. Shalkevich, S. P. Kundas // Actual environmental problems: материалы международной научной конференции молодых ученых, аспирантов, магистрантов, студентов, Минск, 26–27 ноября 2015 г. / МГЭИ им. А. Д. Сахарова БГУ; под общ. ред. С. С. Позняка. – Минск: Институт радиобиологии, 2015. – С. 87–88.

3. *Шалькевич, П. К.* Долгосрочное прогнозирование миграции загрязняющих веществ в природных дисперсных средах с применением технологий параллельных вычислений / П. К. Шалькевич, И. А. Гишкелюк, С. П. Кундас // Новые горизонты 2016: сборник материалов III Белорусско-Китайского молодежного инновационного форума 29–30 ноября 2016 года / Минск: БНТУ, 2016. – С. 90–91.

4. *Shalkevich, P.* Comparison of multi-threading simulation methods of non-isothermal heat and moisture transfer / P. Shalkevich, S. Kundas, A. Moroz // Actual environmental problems: материалы международной научной конференции молодых ученых, аспирантов, магистрантов, студентов, Минск, 24–25 ноября 2016 г. / МГЭИ им. А. Д. Сахарова БГУ; под общ. ред. С. А. Маскевича, С. С. Позняка. – Минск: «Колорград», 2016. – С. 172–173.

5. *Шалькевич, П. К.* Применение технологий компьютерной графики для отображения результатов 3-D моделирования миграции загрязняющих веществ в природных дисперсных средах / П. К. Шалькевич, С. П. Кундас // Сахаровские чтения 2016 года: экологические проблемы XXI века: материалы 16-й международной научной конференции, Минск, 19–20 мая 2016 г. / МГЭИ им. А. Д. Сахарова БГУ: под ред. С. А. Маскевича [и др.]. – Минск, 2016. – С. 293.

## ENVIRONMENTAL IMPACT ASSESSMENT AS ENVIRONMENTAL SAFETY ASSURANCE

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In the modern world, the need to prevent negative impact on the environment increases. The main prevention mechanism is the environmental impact assessment. The purpose of the study is to substantiate proposals for improving the legal regulation of environmental anthropogenic impact assessment, which is based on sustainability and environmental security.

*Keywords:* environmental impact assessment, ecological safety, environmental protection

The negative impact on the environment ensures environmental safety is one of the most pressing problems of our time. Obviously, in order to ensure environmental security is a component of national security, the state