Слайд 1

Hello, the topic of my research work is the creation of a software module for modeling the effective properties of ceramic composites.

Слайд 2

First of all, I would like to say that composite materials are multicomponent materials with high mechanical characteristics. Also, it should be noted, that in nowadays, composite materials are widely used in:

* various industries such as aircraft building, shipbuilding, rocketry
* various fields of medicine and biochemistry

Because of these facts, there is a need to study of composites, their properties and structure.

Слайд 3

And now we turn to my research work. It is associated with the modeling of ceramic composites. The main purpose of my work is the numerical simulation of a ceramic composite of aluminum oxide with carbon nanotubes (Al2O3 – CNT). The work consists of three important stages:

* Creation of a 3D model of the geometry of the material under study
* Calculation of the strength, deformation and elastic properties of the composite
* Analysis and optimization of the results

Further, we will consider these stages in more detail.

Слайд 4

So, the first stage is the creation of a 3D geometry of the material under study. 3D geometry is the so-called cell of periodicity. This is a geometric representation of the studied material, which makes it possible to represent a complex multicomponent system in a simple form. Such cells are programmed in C ++, and then rendered using application programs. Samples of the cell you can see on the slide. Also, it is important to say that now I am at this stage of development.

Слайд 5

After the first stage, we can pass on to the next stage. It is connected with computing module. Computations and definitions of composite properties are based on the multiscale homogenization method. This method combines the finite element method(FEM) and the theory of continuum mechanics. As input data, the periodicity cell will act, and the output data will be the strength and elastic properties of the ceramic composite. Also It should be added in this connection that the computing module will be developed in C ++

Слайд 6

In conclusion, I would like to say that at the end of the work, a software module will be developed that will allow calculating and predicting the mechanical properties of the ceramic composite Al2O3 – CNT. Also It should be noted that the module will be universal and it will be possible to use it to calculate the characteristics of other composite materials.

In the presentation, you marked three important stages, but very little was said about the third stage. Why? Because, this stage will be executed later and now there is little information about it.

Where do you do your work? All development is carried out within the engineering system of Bauman UNIVERSITY