The Galactica System:
A Solution for Problems Involving Interactions According to the laws of Newton and Coulomb

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This is an invitation for the free use of Galactica software. The system was created to solve N-body gravitational interaction problems based on Newtonian physics, and those of electrostatic interactions according to Coulomb's law. It is based on a method of solving differential equations with a high degree of accuracy. For example, the accuracy of the Galactica system is 1000 times greater than the method used by NASA in calculations involving the Solar System.

The Galactica system can be used to study the dynamics and evolution of orbiting bodies, calculate the motion of spacecrafts and probes, simulate star associations, such as with globular star clusters and galaxies, create models of atoms and molecules and calculate their various interactions. In view of its accuracy and universality, the Galactica system should become the standard for use in physics and astrophysics.

A description of some of the solved problems of gravitational interaction is available at the following link:
http://dx.doi.org/10.5539/apr.v4n2p110.

The Galactica system manual is available at:
http://www.ikz.ru/~smulski/GalactcW/GalDiscrE.pdf.

The Galactica system itself, including executable program modules, is available at:
http://www.ikz.ru/~smulski/GalactcW.

Additional information and examples of solved problems using the Galactica system are given in References.

Description of the Galactica system for gravitational interactions was published in [10], and for the Coulomb interactions, in [16].

Gravitational problems solved using the Galactica system were published in [1] - [7], [8] - [13], [18] - [24]. Coulomb interactions were published in [14] – [17]; the Earth's rotational motion problem was published in [8], [21], [24].

The evolution of the Solar system over 100 million years was published in [2], [4], [11], [23] - [24].

The change in angular momentum in the Solar System and the accuracy of the Galactica system are in [19], [23].

The final solution to the problem of the perihelion of Mercury was published in [7], [23].

The movement of asteroids and the transformation of asteroids into satellites of the Earth are considered in [5], [6], [11], [12], [23].

The optimal motion of a spacecraft was published in [3], [23]. This work is important for future space missions.

The interaction of bodies in various stellar structures including the exact solutions of N-body problems, was published in [1], [13], [18], [20], [22], [23].

Creation of new planets in the Solar system was published in [22], [23].

The dynamics and evolution of the rotational motion of the Earth was published in [8], [21], [24].

Exact solutions of the interaction of N charged particles located axisymmetrically in a plane and their evolution, were published in [14] - [15].

The interaction and evolution of multilayer structures on a plane, consisting of charged particles, was published in [17].

There are presentations of a report on the Galactica system at an exhibition in Spain on YouTube in the form of a video: https://youtu.be/uDc-DmTCcZk and in the form of a presentation: https://youtu.be/Z17B3F4oPEI.

There is a presentation of 2 books in 2018 [23] - [24] into https://youtu.be/O57VuriOEJ4. The presentation describes the results of the Galactica system, including a visualization of N-body interactions.

What knowledge should a Galactica user have?

Problems, that are at the forefront of science, can be solved with the help of the Galactica system. In my published works, all the questions of mechanics, mathematics and physics, which are necessary for solving any interaction problem are explained simply, unequivocally and without involving abstract concepts.

The user of the Galactica system must have advanced knowledge of mechanics, physics, mathematics and programming. Additional knowledge: The user will receive additional information by reading my works on topics of interest to him.

Therefore, students and even advanced senior pupils, with the help of their physics and mathematics teachers can solve problems using the Galactica system.

What can students and novice researchers do with Galactica?

Senior pupils can perform calculations on specific problems which may then be submitted to Olympiads and contests.

Students and graduate students can solve problems for term papers and dissertations.

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