

Description for the general public

The aim of this project is to study some mathematical problems which can be applied in the description of many physical phenomena of the existing world, such as non-Newtonian fluids (fluids which have some peculiar physical properties), problems of filtration of the fluids in a porous medium, celestial mechanics and dynamical astronomy, climatology, glaciology.

While dealing with some physical phenomena, it is important to build a mathematical model (equation) whose solution will prescribe the behaviour of these phenomena. Quite often the mathematical model is too complicated to be solved and then some simplifications are first need. One of the aims of this project is to build and solve some of such models.

Some problems in mechanics, especially dealing with destruction of materials cannot be described by single-valued functions. That is why the theory of multivalued functions and corresponding differential inclusions was developed to describe such problems. The solutions of such problems should describe the investigated phenomena in a more precise and realistic way.