SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
CALLING PLANET EARTH - SPACE OUTREACH TO THE GENERAL PUBLIC (3)

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FINDING SOLUTION FOR SPACE DEVELOPMENT THROUGH HUMAN RISK APPRAISAL DURING INTERPLANETARY MISSIONS FOR HIGHLY SKILLED SPECIALISTS EDUCATION

Abstract

One of the major tasks among strategic projects of space development is manned planetary expeditions and construction of habitable bases on other planets. Using prolonged cumulative experience in orbital stations operation we could reach this goal in XXI century. However, lack of knowledge about other planets, unsolved radiation and microbiology safety problems, planetary quarantine and many other unknown issues are the main shortcomings of such plans.

Implementation of manned planetary expeditions and construction of habitable bases on other planets requires special mathematical methods in human risk appraisal in order to support human safety in unknown conditions of hostile environment. Development of special criterions helps to decide the possibility of living in environment like that.

Solution of this objective calls for combination of two subjects: space medicine and biology and special section of mathematical analysis - approximation of nonintrinsic forms. Therefore, a new course for postgraduate students and specialists which allows solving problems of pilot project of new tasks for space activities was developed.

Problem definition has to take into account accuracy requirements, unmanned spacecraft research results, environment limitations, crew resources, etc. At the initial stage it requires to define parameters of the system, their periodicity, accuracy and mode of operation for developing necessary conditions for human activity during interplanetary flight and construction of habitable bases, in other words, parameters of engineering optimization problem. Then we must describe set of technical constraints for the solution of our task. But considering that system could be incompatible, we face theory adaptation problem (first and foremost ambiguity of numerical analysis methods and its software).

As a result, students will be able to form level-based model for their own pilot projects. And thank to quality task analysis at the final stage of education, each student is capable of making special software for correction this model using real integrated criteria.