Methodological Foundations of Design in the University Course of Higher Mathematics

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Abstract: The article deals with methodological approaches to creating content for the Higher Mathematics training course in accordance with conditions of the project-based teaching method. The issues of the rational combination of the elements of classical and computer mathematics in solving applied mathematical problems are discussed. The mechanism used in designing the content for the Higher Mathematics training course on a methodological basis is described. An algorithm for including problematic tasks in a complex project topic is proposed. The requirements for teaching mathematics and skills to solve problem-based situations are formulated. Using the specific examples of various applied tasks, we show possible implementations for compilation of design tasks in mathematics, which are understandable even for undergraduate students without professional training. The idea of "reverse mathematical modeling" is proposed; it involves the search for a physical process according to its mathematical model, which develops engineering, economic and, in general, professional thinking of students.