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ON SOLVING OF SOME CLASSES OF DIOPHANTINE EQUATIONS BY THE METHOD OF IDENTITIES

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Solving algebraic equations with integer coefficients with more than one unknown integer coefficient is one of the most important problems in number theory. It is known that in the general formulation the problem of describing the set of solutions of Diophantine equations in integers is algorithmically insoluble. Despite the efforts of many generations of mathematicians, there are still no general effective methods for their solving in this area. In this paper, we consider some classes of Diophantine equations, the solution in integers of which is of interest both by itself and, for example, in the process of studying complex discrete systems, in searching for optimal structures in organic chemistry and molecular physics, in decoding of computer algorithms, in cryptography, economics and probability theory. Using the identities and their modifications known in algebra, as well as the method of mathematical induction and the Lagrange method, the work shows an effective method for solving both classical Diophantine equations and some of their generalized variants. As a result, we can get formulas expressing general solutions of Diophantine equations. This method can also be applied to other classes of Diophantine equations.

Keywords: Diophantine equations, algebraic identities, mathematical induction method, Lagrange identities, Pell equation.

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