The Application of the Complex Numbers to Solve Diophantine Equations by Finding the Relations between the Coefficients

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A method of solving of the Diophantine equations of the first degree, that lets us to solve these equations in general already exists. But there are no such methods for the Diophantine equations of the higher degrees and their proof remains a very actual problem. The purpose of my research is the analytical solving of the Diophantine equations of this defined type: Cz^n = Ax^2 + By^2, where n = 2, 3, 4, 6 with the determination of relations between the coefficients and finding the final formulas, what lets us to obtain the solutions of that equation. To explain the problem of solving Diophantine equations of the higher degrees the new method is suggested based on the application of complex numbers. Using this method I have successfully completed analytical solutions of these equations. I find the final formulas of solutions of Diophantine equations of this type: Cz^n = Ax^2 + By^2, where n = 2, 3, 4, 6 and also I obtain new conditions of their existence. The results can be used for encryption and decryption data.

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