
TOMAZIN, M.: Gaussova cela števila.

**Diplomska naloga, Univerza v Ljubljani, Fakulteta za matematiko in fiziko,
Oddelek za matematiko, 2016.**

POVZETEK

Namen diplomskega dela je pokazati, kaj Gaussova cela števila so, njihove lastnosti in operacije.

Najprej so definirani osnovni pojmi, vključno z normo in njenimi lastnostmi.

V nadaljevanju si pogledamo deljivost Gaussovih celih števil in razcep na praštevila, kjer ugotavljamo, katera števila so Gaussova praštevila.

Na koncu z Evklidovim algoritmom iščemo največji skupni delitelj in definiramo enolični razcep. Pokažemo, katera praštevila so vsota dveh kvadratov in na koliko možnih načinov lahko zapišemo razcep nekega naravnega števila na Gaussova praštevila.

Ključne besede

Gaussova cela števila, enota, norma, konjugirano število, praštevila, asociirana števila, tuji števili, Gaussova praštevila, Evklidov algoritem, enolični razcep, kongruenca, vsota kvadratov.

TOMAZIN, M.: The Gaussian integers.

Graduation Thesis, University of Ljubljana, Faculty of Mathematics and Physics, Department of Mathematics, 2016.

ABSTRACT

The main objective of this thesis is to provide an introduction to Gaussian integers, their properties and application.

First the basic framework and concepts are explained, including the norm and its properties, followed by an introduction to Gaussian primes, their identification and method of expressing Gaussian integers as unique products of Gaussian primes.

In the remainder of the thesis, unique prime factorization is discussed and applied as a method for determining the greatest common divisor by Euclidean algorithm.

Identification of primes, which are sums of two squares and count of possible expressions of a positive integer as sum of two squares are explained and demonstrated in concluding chapters of the thesis.

Keywords

Gaussian integers, unit, norm, conjugate number, prime, associate, relatively prime, Gaussian prime, Euclidean algorithm, unique factorization, congruence, sum of squares.

MSC(2010): 01A55, 11A05, 11A07, 11A41, 11A51.

Literatura

- [1] J. Grasselli, *Algebraična števila*, Društvo matematikov, fizikov in astronomov SR Slovenije, Ljubljana, 1983.
- [2] J. Grasselli, *Enciklopedija števil*, Društvo matematikov, fizikov in astronomov Slovenije, Ljubljana, 2008.
- [3] J. Grasselli, *Elementarna teorija števil*, Društvo matematikov, fizikov in astronomov Slovenije, Ljubljana, 2009.
- [4] I. Vidav, *Algebra*, Društvo matematikov, fizikov in astronomov Slovenije, Ljubljana, 1989.
- [5] M. Hausner, Theory of Numbers. (10.6.2016) Dostopno na naslovu: <https://math.nyu.edu/faculty/hausner/summary.pdf>.
- [6] K. Conrad, The Gaussian integers. (10.6.2016) Dostopno na naslovu: <http://www.math.uconn.edu/~kconrad/blurbs/ugradnumthy/Zinotes.pdf>.
- [7] N. Sato, Number Theory. (8.7.2016) Dostopno na naslovu: <https://www.artofproblemsolving.com/articles/files/SatoNT.pdf>.
- [8] Wikipedia, Wilson's theorem. (10.7.2016) Dostopno na naslovu: <http://en.wikipedia.org/wiki/Wilson's-theorem>.
- [9] Carl Friedrich Gauss, biografija. (18.7.2016) Dostopno na naslovu: <http://www.matematiki.si/carl-friedrich-gauss/>.