ABSTRACT

FACTORIZATION IN IDEAL RING QUADRATIC $\mathbb{Q}\sqrt{d}$

BY

M. CHALID FANSURY

For a square free integer d other than 1

Let,

$$K = Q[\sqrt{d}] = \{x + y\sqrt{d}; x, y \in Q\}$$

Next, K is called quadratic field and it has two variable set of rational number Q, the form number of K is,

$$\{a + b\sqrt{d}; a, b \in Z\}\ if\ d \not\equiv 1\ mod\ 4$$

and

$$\left\{a + b\left(\frac{1 + \sqrt{d}}{2}\right); a, b \in Z\right\}\ if\ d \equiv 1\ mod\ 4$$

For $\alpha \in K$, set of $Tr(\alpha) = \alpha + \bar{\alpha}$ and $N(\alpha) = \alpha\bar{\alpha}$ itself is called trace and norm from α. Every ideal in $\mathcal{O}_K$ that built by element Z is principal ideal. If an ideal in $\mathcal{O}_K$ has 1 element from Z that relatively prime, then that ideal is unit ideal. Then let (2) ideal in $\mathcal{O}_K$ with $\alpha \in \mathcal{O}_K$ and ideal (α) can be factorized.

Key Words : square free, principal ideal, unit ideal, *trace*, *norm*, *irreducible*, *ring quadratic*.