

**MA40238 NUMBER THEORY 2013/14 SEMESTER 1
WEEK 8 OVERVIEW**

RECAP

Last week, we discussed

- (1) How to find all algebraic integers in some number fields.
- (2) The discriminant of n elements in a number field (of degree n).
- (3) The existence of an integral basis for a non-zero ideal I in \mathcal{O}_K .
- (4) The discriminant of an ideal I in \mathcal{O}_K and the discriminant of the number field K .

MONDAY LECTURE

Topic. The norm of a non-zero ideal I in \mathcal{O}_K .

- (1) We will give three equivalent descriptions of the norm of the ideal I : in terms of discriminants, in terms of matrices, in terms of quotient rings.
- (2) The third description has an important consequence: the ascending chain condition.
- (3) We will see how to compute the norm of a principal ideal.

TUESDAY LECTURE

Topic. Unique factorisation of ideals in \mathcal{O}_K .

- (1) We will define prime ideals and maximal ideals and discuss some examples.
- (2) We will state some convenient tools for dealing with products of ideals. Proofs are left in exercises.
- (3) We will state and prove the theorem of unique factorisation of ideals in \mathcal{O}_K .