

MAT 4200, mandatory assignment

A short essay (3-5 pages) on a freely chosen topic within commutative algebra. Below you will find a few suggestions.

- The title of your essay should be approved by Arne B. Sletsjøe before October, 9. Send an email to arnebs@math.uio.no
- It is allowed to work together on the project, but each student must write their own version. Please enter the name(s) of your collaborators.
- If you submit your essay before October, 23, you will eventually get some comments on your draft, and you have the possibility to submit a final version. The deadline for the final version is November, 5.

Some possible topics:

1. Derivations and Kähler differentials. Definitions, some results and nice examples.
2. Support and associated primes ($\text{Supp}(A)$ og $\text{Ass}(A)$), - and the relations between them.
3. Primary decomposition, important results and some nice examples.
4. Classification of k -algebras (up to isomorphisms) of vector space dimension less or equal to 4. Hierarchy of degeneration (ask for explanation).
5. Various forms of Nakayama's lemma and applications.
6. Going up Theorem, with proof, geometrical interpretation and illustrations on nice examples.
7. Hilbert functions, Hilbert polynomials and the dimension of a ring.
8. Noether normalization, proof, variations, examples and illustrations.