Algebra 2010-Aalborg University

19th Lecture: Thursday November 25th, 12:30-16:15 at room G5-112.

- 12:30-13:00 Repetition from last lecture. Division with remainder in $R[X]$. Roots of polynomials (pages 148–153).

- 13:00-15:00 Work in groups. Exercises from [Lau], 4.10 (page 179): A, 4, 5, B, 6, 7, 15 + some exercises from previous lectures that you did not solved yet or see the proof of some proposition/theorems.

  Exercise A: Let $R = \mathbb{F}_5$. Let $f = 2X^7 + 3X^6 + X^4 + 2X^2 + 2X \in R[X]$, $d = 2X^2 + 3X + 1 \in R[X]$. Divide f by d with remainder. i.e. find q and r (shall we use Proposition 4.2.4 or Corollary 4.2.5?).

  Exercise B: Prove proposition 4.2.4 with detail. Following proposition's notation: In particular, prove that aX^m divides bX^n if and only if $n \geq m$ and $a|b$. Prove that if $aX^m|bX^n$ there is $c \in R$, unique, such that $b = ca$ and $bX^n = cX^{n-m}aX^m$.

- 15:00-16:15 Lecture: Differentiation of polynomials. Ideals in polynomial rings. Polynomial rings modulo ideals (pages 153–154 and 161–167).

Best regards,

Diego Ruano