ERRATA FOR GRADUATE ALGEBRA: COMMUTATIVE VIEW

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1. Extra result needed on p. 243

Lemma: If an affine integral domain R is an integral extension of C, then every saturated chain $P \supset \cdots \supset P'$ of prime ideals of R intersects down to a saturated chain of prime ideals $P \cap C \supset \cdots \supset P' \cap C$ of C.

Proof: Passing to R/P' and $C/(P' \cap C)$, one may assume that $P' = 0$, and it suffices to prove that if P has height 1, then so does $P \cap C$. But C is integral over some polynomial ring C', so R is integral over C'. By Going Down (Theorem 6.47), $P \cap C'$ has height 1. But this implies $P \cap C$ has height 1.$\square$

Also, Exercise 6.8 on page 265 is harder than desirable.

The proof of Theorem 10.36 needs more detail. On page 303, line 3, we should multiply f by the leading coefficient of g. Then, for line 5 on p. 303, LO shows that each prime ideal of R_f lifts to a prime ideal of $F[V]_f$. Thus each point of $\mathcal{D}(f)$ corresponds to an algebra homomorphism $R_f \to F$ whose kernel lifts to a prime ideal of $F[V]_f$ yielding a point of $\mathcal{D}(g)$, proving that $\Phi(\mathcal{D}(g)) \supseteq \mathcal{D}(f)$.

2. misprints

Chapter 2

- Page 66 line -9: A has the form $\begin{pmatrix} r & 0 \\ 0 & A' \end{pmatrix}$, where $\rho(r) = d$ and
- Page 72 line -3: $\bar{\lambda} = \lambda + F[\lambda]d_i$

Chapter 4

- Page 148 line -5: between λ and x.

Chapter 6

- Page 182 line -8: If A_1,
- Page 188 line -84: Lemma 6.29. But if

Chapter 7

- Page 211 line 8: By Example 3.3,
- Page 222 line 11: $\hat{A} \subseteq W\hat{S}$.

Chapter 8

- Page 235 line -9: $S = R \setminus (P_1 \cup \cdots \cup P_t)$.

Exercises – Part II

- Page 252, #44 : The equation $\lambda^3 + b^2\lambda - 2b^2c = 0$
- Page 268, #22 : Induction on Exercise 21.
- Page 280, line 10: is called **faithful** if
- Page 281, #8 : $\cap_{n\in\mathbb{N}} A^n = 0$.

Chapter 10

- Page 302, line 2,3: $\phi^* f(w_1, \ldots, w_n) = f(\phi(w_1), \ldots, \phi(w_n))$;
- Page 302, line 12: $\mathrm{Alg}(F[W], F)$
- Page 311, line 1: of affine varieties

Chapter 11

- Page 314, line 23: Definition 10.43
- Page 317, line 6: Exercise 10.23

List of major results

- Page 413, line -7: $(C + I)/I$
- Page 418, line -11: $K[\sqrt{-1}]$

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