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Elementary Algebraic Geometry by Klaus Hulek - Errata

p 13, Exercise 0.14: Strictly speaking this argument shows that $GL(n, k)$ is in bijection to an algebraic set. The reader should also consult Proposition 1.84 to complete the argument.

p 15, Exercise(1) and (2): Delete the word ‘variety’ which has not been defined.

p 15, Exercise 1a: Insert a left parenthesis before $\cos t$.

p 15, Exercise 3: The term ‘qualitatively different pictures’ is not well defined, to give it the intended meaning one should think of the projective classification of (irreducible) cubics. There are moreover five different types.

p 19, l 10: $J \subset \sqrt{J}$.

p 24, l -1: which are precisely the polynomials without constants.

p 28, l 7: Delete the end of the sentence ‘and so $B[x]$ is a finite B -algebra’ (This extra phrase belongs to part (3) of the lemma, rather than part (2).)

p 29, l 11: $f(x'_1 + \alpha_1 x_n, \dots, x'_{n-1} + \alpha_{n-1} x_n, x_n)$.

p 33, l 13: \mathbb{A}_k^2 should be \mathbb{A}_k^3 .

p 33, l 13: $k[x_1, x_2, x_2]$ should be $k[x_1, x_2, x_3]$.

p 33, l 21: $\{(x, a, b) \mid x^2 - ax - ab = 0\}$.

p 34, l 5: intuitive.

p 34, l -10: polynomial.

p 34, l -6.: all nonconstant polynomials.

p 36, l 1: integral domain.

p 47, l 17: $\varphi = F(f)$, $G(\varphi) = f$.

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p 55, l -2: irreducible.

p 56, l 22: $f^*(y/x)$.

p 59, l 13: Delete the stray comma. The target of the map is C , and not \mathbb{C} .

p 68, l 2-4: The quadrics are in \mathbb{P}_k^3 , rather than \mathbb{P}_k^2 . The definitions should read

$$(x_0 : x_1 : x_2 : x_3) \in \mathbb{P}_k^3.$$

p 69, l-2: To make the decomposition unique we must require that $f \neq 0$, the d_i are distinct, and the f_i are nonzero.

p 78, l 10: Delete the word ‘homogeneous.’

p 85 l 14: lowest common denominator.

p9, l-1: $((\mu t, \lambda t), (\mu : \lambda))$.

p 94 Exercise 2(c): ‘projective transformations’ are not formally defined until page 117; however they are defined in passing later in this exercise set, exercise 10 (page 95).

p 94, Exercise 4: ‘projective variety’ should read ‘irreducible projective variety’ since morphisms were only defined on irreducible projective and quasi-projective varieties.

p 95 Exercise 7: The condition on the rank should be < 2 .

p10, l -6: $\text{tr deg}_k K$

p 112, Exercise 5: Replace \mathbb{A}_k^2 with \mathbb{A}_k^3 .

p 120, l 10: Lemma 4.5.

p 128, l 12: $z_I z_J = z_K z_L$ for $I + J = K + L$.

p 159, l 14: The l''_i are different from the l'_j . Otherwise if $l''_i = l'_i$, then l and m would be lie on the plane of $l_i \cup l'_i = l_i \cup l''_i$, giving four coplanar

lines l, m, l_i, l'_i , contradicting Proposition 5.11. Also, $l''_i \neq l'_j$ for $i \neq j$ since $l''_i \cap l_i \neq \emptyset = l'_j \cap l_i$.

p 160, l 14: (2) n cannot intersect fewer than two of the l_i . Otherwise it would intersect, say l'_1, l'_2, l'_3 , and l'_4 . But then n, l and l''_5 would be three common transversals to those lines and hence contradict Lemma 5.14.

(3) n cannot intersect precisely two of the l_i . In this case we could assume that n intersects l'_1, l'_2, l'_3, l_4 and l_5 . But now n, l and l''_4 would be common transversals to l'_1, l'_2, l'_3 and l_4 , again contradicting Lemma 5.14.

p 161, l 9: m meets l''_1, \dots, l''_5 and l_1, \dots, l_5 .

p 173, l 1: $t \circ f$.

p 177, l -11: Replace ‘algebraic closure’ with ‘integral closure’.

p 179, l-16: Replace ‘algebraic’ with ‘integral’.

p 179, l -10: $U = f^{-1}(V)$.

p193. The order of Corollaries 6.50 and 6.51 should be interchanged.

p 197, l 7: $C \rightarrow \mathbb{P}_k^1$.

p 198, l 11: The Grassmannian $G(1, n) \subset \mathbb{P}_k^n$ can be identified with the subset of $\mathbb{P}(\bigwedge^2 k^{n+1})$ of the images in this projective space of nonzero tensors of the form $v \wedge w$.

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