Page 23, part (c) of Exercise 5: “Adapt the argument given at the end of the section” should be “Adapt the argument used for the circle $x^2 + y^2 = 1$”

Page 24, line 1: “adapt the argument given at the end of the section” should be “adapt the argument used for the circle $x^2 + y^2 = 1$”

Page 37, line 2 of part (c) of Exercise 16: “Binomial Theorem” should be “binomial theorem”

Page 39, line 6 of the paragraph beginning “To see why this algorithm works”: “By (5),” should be “By (1),”

Page 47, part (a) of Exercise 14: “where $h(a) \neq 0$” should be “where $r \geq 1$ and $h(a) \neq 0$”

Page 53, line 2 of Exercise 5: “affine algebraic varieties” should be “affine varieties”

Page 63, bottom display, second line underneath $)$: “$xy^2 - x$” should be “$x^2y - x$”

Page 63, bottom display, fourth line underneath $)$: “$x^2y - y$” should be “$xy^2 - y$”

Page 66, lines −5 and −6: “[using condition (ii) of the definition of a monomial order]” should be “[using Lemma 8 of §2]”

Page 81, line 1 of Exercise 2: “$\text{LT}(I)$” should be “$\langle \text{LT}(I) \rangle$”

Page 82, last line of Exercise 13: “Exercise 14 of Chapter 1, §4” should be “Proposition 8 of Chapter 1, §4”

Page 89, part (d) of Exercise 5: “$z^2 - 3z$” should be “$z^2 - 3z$”

Page 93, line −3: “$\langle \text{LT}(G \setminus \{p\}) \rangle$” should be “$\langle \text{LT}(G \setminus \{g\}) \rangle$”

Page 96, line 4 of part (b) of Exercise 10: “$g_j = x_t + D$” should be “$g_j = x_\ell + D$”

Page 96, line 4 of part (b) of Exercise 10: “$S(g_i, g_j) = x_tC - x_sD$” should be “$S(g_i, g_j) = x_\ell C - x_sD$”

Page 96, line 2 of part (a) of Exercise 12: “is not divisible by” should be “has leading term not divisible by”

Page 97, line 3 of Exercise 14: “$\frac{x_j - a_j}{a_i - a_j}$” should be “$\frac{x - a_j}{a_i - a_j}$”
§3. If we divide \( f = xy^2 - x \) by \( G = (xy - 1, y^2 - 1) \), the division algorithm gives

\[
xy^2 - x = y \cdot (xy - 1) + 0 \cdot (y^2 - 1) + (-x + y)
\]

so that \( \overline{f}^G = -x + y \neq 0 \). Yet we can also write

\[
xy^2 - x = 0 \cdot (xy - 1) + x \cdot (y^2 - 1),
\]

Page 107, line -4: “\( f_3 = xz + y - z + 1 \)” should be “\( f_3 = xz - x + y + 1 \)”

Page 108, Exercise 1: “\( f_3 = xz + y - z + 1 \)” should be “\( f_3 = xz - x + y + 1 \)”

Page 110, Lemma 4: The statement of the lemma should be changed to the following:

**Lemma 4.** Every element of \( S(F) \) can be written as a sum of homogeneous elements of \( S(F) \). Furthermore, this decomposition is unique.

Page 115, line 12 “by Lemma 2” should be “by Lemma 2 of §9”

Page 136, line 20: “\((t,u,x,y,z) \in V(I) \subseteq \mathbb{R}^5\)” should be “\((t,u,x,y,z) \in V(I) \subseteq \mathbb{C}^5\)”

Page 140, Exercise 3: “\( t^2 \) is always positive” should be “\( t^2 \) is always \( \geq 0 \)”

Page 142, part (a) of Exercise 11: In two places, replace \( F \) by \( G \)

Page 142, part (b) of Exercise 11: Replace \( F \) by \( G \)

Page 142, line 3 of Exercise 13: “\( x_i = f_i(t)/g_i(t) \)” should be “\( x_\ell = f_\ell(t)/g_\ell(t) \)”

Page 142, line 4 of Exercise 13: “each \( i, f_i(t) \) and \( g_i(t) \)” should be “each \( \ell, f_\ell(t) \) and \( g_\ell(t) \)”

Page 153, line 1: “straight lines” should be ”straight line”

Page 153, line 4: “These lines have” should be “This line has”

Page 154, part (c) of Exercise 15: The \( x \)-coordinate of the second displayed point should be

\[
\pm \frac{1}{2} \sqrt{15 + 6 \sqrt{2} - 12 \sqrt{4}}
\]

Page 160, part (b) of Exercise 4: “\( g_o = g_3 \)” should be “\( g_o = g_2 \)”

Page 167, line -16: Replace “It follows that” with “(Proposition 5 applies to \( f,g \) since their coefficients lie in the field \( k(x_2, \ldots, x_n) \)). It follows that”

Page 169, line -7: “\( u_1(x_1) \)” should be “\( u(x_1) \)”
Page 170, line 1: “\((f_i, f^*)\)” should be “\((f_i, f^*)\)”

Page 170, part (c) of Exercise 3: “part (a) is still true but part (b) can fail” should be “parts (a) and (b) are still true”

Page 171, line 2 of Exercise 9: “\(l \geq m\)” should be “\(l \geq m > 0\)”

Page 180, line 13: “must have \(f_i(a_1, \ldots, a_n) = 0\)” should be “must have \(f_i(a_1, \ldots, a_n) \neq 0\)”

Page 181, lines 1 and 2 of Exercise 10: “\(\mathbb{R}[x, y]\)” should be “\(\mathbb{R}[x, y, z]\)” in two places.

Page 181, line 4 of Exercise 10: “same for \(\mathbb{R}[x]\)” should be “same for \(\mathbb{R}[x] \text{ and } \mathbb{R}[x, y]\)”

Page 187, line −3: “\(a_i \frac{\partial f_i}{\partial x_j} h_i\)” should be “\(a_i \frac{\partial f_i}{\partial x_j} h_i\)”

Page 189, Exercise 15: Replace the hint with “Hint: Show that \(xy, xz, yz\) generate the ideal of leading terms of \(\sqrt{I}\) and use the definition of Gröbner basis given in Chapter 2, §5.”

Page 190, line 15: “We have sketched \(V(I)\) and \(V(J)\) on the next page” should be “We have sketched \(V(I)\) and \(V(J)\) below”

Page 196, line 4: “principal ideals is principal)” should be “two principal ideals is principal)”

Page 199, lines 1–2 of Definition 2: “smallest affine algebraic variety” should be “smallest affine variety”

Page 201, line 12: “varieties \(k^n\)” should be “varieties in \(k^n\)”

Page 206. Exercise 5: Replace the hint with “Hint: Examine the generators of \(J^{s^M}\)”

Page 206, Exercise 7: “and the Exercise 4” should be “and Exercise 4”

Page 212, Exercise 10: “Theorem 11 implies” should be “Theorem 11 and Proposition 6 of §7 imply”

Page 212, line 2 of part (e) of Exercise 13: In “where \((f_i)_{\text{red}}\) is”, there needs to be more space between “)” and “f”.

Page 219, line −18: “is projection” should be “be the projection”

Page 221, line 1: “by Exercise 3 of Chapter 2, §9” should be “by Exercise 15”

Page 221, Corollary 3: “With the same notation” should be “With \(k\) algebraically closed and the same notation”

Page 222, line 4: “for all \(i\)” should be “for all such \(i\)”

Page 222, line 6: “If follows that” should be “It follows that”
Page 222, line immediately before Proposition 5: “what works for $V$” should be “that works for $V$”

Page 222, line 4 of Proposition 5: “$\pi_l(\mathbf{V}(I))$” should be “$\pi_l(\mathbf{V}(I))$”

Page 222, line 5 of Proposition 5: “a variety contained in $V$” should be “a variety contained in $\mathbf{V}(I)$”

Page 223, line −17: “$W \not\subset \mathbf{V}(I)$” should be “$W \not\subset \mathbf{V}(I)$”

Page 223, line −9: “fails for $I, \mathbf{V}(I)\$” should be “fails for $I, \mathbf{V}(I)\$”

Page 223, line −8: “by Proposition 4” should be “by Proposition 4 (we can assume $G$ is reduced)”

Page 224, second display: The display should be as follows:

$$\mathbf{V}(I_1) \setminus \mathbf{V}(c_1) = \mathbb{C} \setminus \mathbf{V}(y) = \mathbb{C} \setminus \{0\} \subseteq \pi_1(\mathbf{V}(I)) \subseteq \mathbf{V}(I_1) = \mathbb{C}.$$ 

Page 226, two lines below display (2): “$W_2 \setminus Z_2 \subset \pi_l(V_1)$” should be “$W_2 \setminus Z_2 \subseteq \pi_l(V_1)$”

Page 228: Add the following new exercise:

15. In the setting of Theorem 2, prove that $x^7 > \text{lt}(f)$ implies $x^7 > \text{lt}(\bar{f})$ for $f \in k[x,y]$.

Page 231, line 9: “EXERCISES FOR §9” should be “EXERCISES FOR §8”

Page 231, part (b) of Exercise 11: “Exercise 4” should be “Exercise 6”

Page 231, Exercise 12: “Use Proposition 9 of §4” should be “Use Exercise 4 of §4”

Page 232, line 2: “The table on the next page” should be “The table below”

Page 247, line 1: “$R = k[x,t]$” should be “$R = k[t]$”

Page 247, line 2 of part (b) of Exercise 10: “$a, b \in k[x]$” should be “$a, b \in k$”

Page 255, line 6: “goal to find” should be “goal is to find”

Page 255, line 12: “polynomials $G_{i-1}$” should be “polynomials in $G_{i-1}$”

Page 256, Exercise 6: “Let $V = \mathbf{V}(x_3 - x_1^2, x_4 - x_1x_2, x_2x_4 - x_1x_5, x_4^2 - x_3x_5) \subseteq \mathbb{C}^5$” should be “Let $V = \mathbf{V}(I) \subseteq \mathbb{C}^5$ for $I = (x_3 - x_1^2, x_4 - x_1x_2, x_2x_4 - x_1x_5, x_4^2 - x_3x_5) \subseteq \mathbb{C}[x_1, x_2, x_3, x_4, x_5]$”

Page 256, line −1: At the end, add “Assume that the field $k$ is infinite.”

Page 257, part (e) of Exercise 11: “we developed in Chapter 1” should be “we developed in Chapter 1, §2”
Page 260, lines 2–4: These three lines

(iii) is proved in the same way as Theorem 11 of Chapter 4, §5.

When \( k \) is algebraically closed, the Weak Nullstellensatz also holds in \( k[V] \). You will prove this in Exercise 16.

should be replaced with the following:

(iii) is proved by first showing that the Weak Nullstellensatz also holds in \( k[V] \). You will prove this in Exercise 16. From here, one proceeds in the same way as Theorem 11 of Chapter 4, §5.

Page 271, line following second display: “\( \mathbf{V}_W(a^2 - b^2 + 4) \)” should be “\( \mathbf{V}_W(y^2 - z^2 + 4) \)”

Page 272, second paragraph of the proof of Proposition 6: In two places, “\( \mathbf{V}(f_i g'_i - f'_i g_i) \)” should be “\( \mathbf{V}_V(f_i g'_i - f'_i g_i) \)”

Page 278, line –6: “since we do not the ideal” should be “since we do not want the ideal”

Page 279, display (1): Replace the display with

\[
\begin{align*}
s^\ell + c_1 s^{\ell-1} + \cdots + c_\ell &= 0, \quad c_1, \ldots, c_\ell \in R.
\end{align*}
\]

Page 279, line –10: “\( a_{i\ell} s_{i\ell} \)” should be “\( a_{i\ell} s_\ell \)”

Page 279, line –7: “the coefficient of \( x \) is” should be “the coefficient of \( x^\ell \) is”

Page 279, the last display should be:

\[
\det(A - x I_\ell) = (-1)^\ell (x^\ell + c_1 x^{\ell-1} + \cdots + c_\ell).
\]

Page 279, line –4: “\( a_i \in R \)” should be “\( c_i \in R \)”

Page 280, line 4: “\( C \) has entries in \( R \)” should be “\( C \) has entries in \( S \)”

Page 280, line –13: “(ii) \( \Rightarrow \) (iii)” should be “(i) \( \Rightarrow \) (iii)”

Page 280, line –9: “divide \( f \) by \( G \)” should be “divide \( f \) by a Gröbner basis \( G \)”

Page 282, seven lines below the figure: “the Zariski closure” should be “is the Zariski closure”

Page 282, line –6: “finite over \( k[y] \)” should be “finite over \( k[y_1, \ldots, y_m] \)”

Page 284, line 1: “The surprise that” should be “The surprise is that”

Page 284, line 10: “algebraically independently” should be “algebraically independent”

Page 288, line 2 of Exercise 6: “means geometrically” should be “means geometrically when \( k \) is algebraically closed”
Page 288, line 1 of Exercise 13: “in (4) is” should be “in (5) is”

Page 288, line 2 of part (a) of Exercise 13: “the substitution (5)” should be “the substitution (4)”

Page 288, line 3 of part (a) of Exercise 13: “of \( s^d_i \) in is” should be “of \( s^d_i \) is”

Page 289, last line of part (a) of Exercise 17: “\( \phi(\mathbf{V}(J)) \)” should be “\( \pi(\mathbf{V}(J)) \)”

Page 291, line 8: The correct hyphenation is “re-searchers”

Page 294, line below second display: “\( C = U \times V \)” should be “\( C = U \times V \)”

Page 298, two lines below third display: The correct hyphenation is “ex-ercises”

Page 300, first display: “\( f(\theta_1 + \theta_2 + \theta_3) \)” should be “\( f(\theta_1, \theta_2, \theta_3) \)”

Page 301, paragraph beginning “We will next discuss”: Insert a blank line between the beginning of this paragraph and the end of the previous paragraph.

Page 302, line 2: “\( \mathcal{J} = \mathbf{V}(x_1^2 + y_1^2 - 1, x_2^2 + y_2^2 - 1, x_3^2 + y_3^2 - 1) \)” should be “\( \mathcal{J} = \mathbf{V}(c_1^2 + s_1^2 - 1, c_2^2 + s_2^2 - 1, c_3^2 + s_3^2 - 1) \)”

Page 302, two lines below (7): “\( V = \mathbf{V}(x_1^2 + y_1^2 - 1, x_2^2 + y_2^2 - 1, x_3^2 + y_3^2 - 1) \)” should be “\( V = \mathbf{V}(c_1^2 + s_1^2 - 1, c_2^2 + s_2^2 - 1, c_3^2 + s_3^2 - 1) \)”

Page 303, Exercise 2: The correct hyphenation is “co-ordinates”

Page 304, part (a) of Exercise 9: “result of part (c)” should be “result of part (e)”

Page 305, line 12: “in equation (7) of \( \S 2 \)” should be “in equation (6) of \( \S 2 \)”

Page 305, line 1 of (2): “\( \frac{2bl_2l_3}{2l_2(a^2 + b^2)}s_2 \)” should be “\( \frac{bl_2l_3}{l_2(a^2 + b^2)}s_2 \)”

Page 305, line 2 of (2): “\( \frac{2al_2l_3}{2l_2(a^2 + b^2)}s_2 + \)” should be “\( \frac{al_2l_3}{l_2(a^2 + b^2)}s_2 - \)”

Page 306, line 1 of (3): “\( \frac{2b}{2(a^2 + b^2)}s_2 \)” should be “\( \frac{b}{a^2 + b^2}s_2 \)”

Page 306, line 2 of (3): “\( \frac{2a}{2(a^2 + b^2)}s_2 + \)” should be “\( \frac{a}{a^2 + b^2}s_2 - \)”

Page 307, line -3: “when \( a^2 + b^2 < 4 \)” should be “when \( 0 < a^2 + b^2 < 4 \)”

Page 308, line 6: “if \( l_4 \) lies in” should be “if \( l_2 = l_3 = 1 \) and \( l_4 \) lies in”

Page 308, line 8 of the subsection Specialization of Gröbner Bases: “\( k[x_1, \ldots, x_m, t_1, \ldots, t_m] \)” should be “\( k[x_1, \ldots, x_n, t_1, \ldots, t_m] \)”
Page 309, display in the middle of the page: Replace the display with

\[ 1, l_2, l_3, l_2, l_3, 1, l_2l_3, l_2l_3, l_2l_3, a, b, a^2 + b^2, l_2l_3. \]

Page 309, two lines below display: “\( a, b, l_2, l_3, a^2 + b^2 \) and \( a^2 + b^2 - l_2^2 - l_3^2 \) are nonzero” should be “\( a, b, l_2, l_3 \) and \( a^2 + b^2 \) are nonzero”

Page 309, nine lines below display: “concept of a” should be “the concept of a”

Page 309, line -4: “to be Gröbner cover” should be “to be a Gröbner cover”

Page 312, line 3: “We have” should be “When \( l_2 = l_3 = 1 \), we have”

Page 315, part (c) of Exercise 5: “the choice of \( t \in \mathbb{R} \)” should be “the choice of \( t \in \mathbb{R} \)?”

Page 316, line 5: “\( B_{ij} \in k(t)[x] \)” should be “\( B_{ji} \in k(t)[x] \)”

Page 316, part (c) of Exercise 7: Replace the hint with “Hint: The monomial orders for \( k(t)[x] \) and \( k[x] \) are the same—the parameters \( t_j \) are “constants” as far as the ordering is concerned. Theorem 6 of Chapter 2, §9 will be useful.”

Page 316, lines 7 and 8 of Exercise 8: Delete these lines and replace them with the following:

Nonzero polynomials \( F_i \) and \( G_j \) in \( k[t] \), we get

\[ \tilde{f}_i = F_if_i, \quad \tilde{g}_j = G_jg_j \in k[x,t]. \]

Page 316, line 9 of Exercise 8: “\( \tilde{I} \subseteq k(t)[x] \)” should be “\( \tilde{I} \subseteq k[x,t] \)”

Page 316, part (a) of Exercise 8: Replace part (a) with the following:

a. Fix \( j \) and suppose \( g_j = \sum_{i=1}^s B_{ji} f_i \) in \( k(t)[x] \) and let \( d_j \in k[t] \) be a polynomial that clears the denominators of \( B_{j1}, \ldots, B_{js} \). Also let \( F = \text{lcm}(F_1, \ldots, F_s) \). Then prove that

\[ d_j \in (\tilde{I} : F\tilde{g}_j) \cap k[t], \]

where \( \tilde{I} : F\tilde{g}_j \) the ideal quotient as defined in §4 of Chapter 4.
Page 316, part (b) of Exercise 8: “(\tilde{I} : \tilde{g}_j) \cap k[t]” should be “(\tilde{I} : F\tilde{g}_j) \cap k[t]”

Page 316, part (b) of Exercise 8: “to describe an algorithm for finding the subset \( W \subseteq k^m \) described in” should be “to give an algorithm for finding a subset \( W \subseteq k^m \) with the property described in”

Page 317, line 1: “a monomial on order” should be “a monomial order on”

Page 317, part (b) of Exercise 11: “\( c_i \in \mathbb{R}[a, b, l_2, l_3] \)” should be “\( h_i \in \mathbb{R}[a, b, l_2, l_3] \)”

Page 326, line 4 of the first display should be:

\[
f_4 = x_3u_3 + x_4u_1 - x_4u_2 - u_1u_3,
\]

Page 327, line 2 of Definition 7: “\( \mathbb{R}[u_1, \ldots, u_m, x_1, \ldots, x_n] \)” should be “\( \mathbb{R}[u_1, \ldots, u_m, x_1, \ldots, x_n] \)”

Page 331, part (b) of Exercise 2: Replace with “b. With this choice, explain why we can specify the coordinates of \( B \) as \( B = (u_3, 0) \), i.e., the \( x \)-coordinate of \( B \) is arbitrary, but the \( y \)-coordinate is zero.”

Page 332, Exercise 10: “made in Example 1” should be “made in the continuation of Example 1”

Page 332, line −1: “reducible components” should be “irreducible components”

Page 333, line 2 of part (e) of Exercise 14: “follows from part (a)” should be “follows from part (b)”

Page 333, line 2 of part (e) of Exercise 14: “\( (c \cdot g)’s \)” should be “\( (c \cdot g)’s \)”

Page 333, line 3 of part (c) of Exercise 15: “show that \( \mathfrak{c} \) has” should be “show that \( c\mathfrak{c} \) has”

Page 336, lines 6-7: Interchange the order of these two lines. Thus the line “\( q := \ldots \)” should be above the lines “\( r := \ldots \)”

Page 338, line −7: “degree in \( x_n \) are reduced” should be “degree in \( x_n \) is reduced”

Page 348, line −6: “LT(\( \sigma_1 \sigma \))” should be “LT(\( \sigma_1 \sigma_2 \))”

Page 354, first display of Exercise 11: “\( h_{j-i}(x_k, \ldots, x_n) \)” should be “\( h_{j-i}(x_j, \ldots, x_n) \)”

Page 355, line 1 of the display in Exercise 15: “\( +(-1)^{j-1}\sigma_{k-1}x_i + (-1)^j\sigma_k = \)” should be “\( +(-1)^{j-1}\sigma_{j-1}x_i + (-1)^j\sigma_j = \)”

Page 355, line 3 of Exercise 16: “coefficients \( \mathbb{F}_2 \)” should be “coefficients in \( \mathbb{F}_2 \)”

Page 355, display of Exercise 18: “\( = s_j = \sigma_1 s_{j-1} + \)” should be “\( = s_j - \sigma_1 s_{j-1} + \)”

Page 356, line 7: “every linear map” should be “every invertible linear map”
Page 361, second display of **Example 13**: Replace with the following:

\[ x^iy^j = \begin{cases} 
  x^{2m}y^{2l} = (x^2)^m(y^2)^l & \text{if } i, j \text{ are even} \\
  x^{2m+1}y^{2l+1} = (x^2)^m(y^2)^lxy & \text{if } i, j \text{ are odd.} 
\end{cases} \]

Page 362, Exercise 6: “\(k[x, y, z]^G\)” should be “\(\mathbb{R}[x, y, z]^G\)” in part (d) and again in part (e)

Page 362, part (a) of Exercise 7: “\(k[x, y, z]^G\)” should be “\(\mathbb{R}[x, y, z]^G\)”

Page 363, second line of the first display: The third factor of \(g\) should be “\((x - y + z)\)”

Page 363, part (b) of Exercise 7: “\(k[x, y, z]^G\)” should be “\(\mathbb{R}[x, y, z]^G\)” twice one line below the display, once two lines below the display, and once three lines below the display

Page 364, part (b) of Exercise 14: “Use the method of Exercise 13” should be “Use the method of Exercise 12”

Page 367, line −1: At the end of the display, “\(\sum_{|\beta|=|G|} R_G(x^\beta)u^\beta\)” should be “\(\sum_{|\beta|=|G|} b_\beta R_G(x^\beta)u^\beta\)”

Page 369, line −8: “\(g(y_1, \ldots, y_m)\) for some \(g \in k[y_1, \ldots, y_m]\)” should be “\(h(y_1, \ldots, y_m)\) for some \(h \in k[y_1, \ldots, y_m]\)”

Page 369, line −6: “\(+ g(y_1, \ldots, y_m)\)” should be “\(+ h(y_1, \ldots, y_m)\)”

Page 369, line −5: “\(g\) need not be” should be “\(h\) need not be”

Page 369, line −1: “divide \(g\) by \(G\)” should be “divide \(h\) by \(G\)”

Page 370, line 1: “\(g = B_1g_1 + \)” should be “\(h = B_1g_1 + \)”

Page 370, line 8: “Since \(G\) a Gröbner” should be “Since \(G\) is a Gröbner”

Page 372, part (b) of Exercise 8: “use Exercise 6 and §2” should be “use Exercise 6 and Example 13 of §2”

Page 375, line 3: “let \(G\) be a” should be “let \(G\) be a”

Page 375, line 4: “\(G \cap k[y_1, \ldots, y_m]\)” should be “\(G \cap k[y_1, \ldots, y_m]\)”

Page 376, line −11: “Gröbner basis \(G\)” should be “Gröbner basis \(G\)”

Page 376, line −11: “let \(\mathcal{G}^G\) be the” should be “let \(\mathcal{G}^G\) be the”

Page 376, line −10: “on division by \(G\)” should be “on division by \(G\)”

Page 376, line −10: “the remainders \(\mathcal{G}^G\)” should be “the remainders \(\mathcal{G}^G\)”

Page 382, part (c) of Exercise 2: “Use Exercise 13” should be “Use Exercise 16”
Page 382, line 2 of Exercise 9: “\( b = A \cdot a \)” should be “\( b = A \cdot a \)”

Page 383, line 2 of Exercise 12: “\( G \cdot b \cup G \cdot a - \{a\} \)” should be “\( (G \cdot b \cup G \cdot a) \setminus \{a\} \)”

Page 383, line 6 of Exercise 15: “chapter–then” should be “chapter—then”

Page 383, line 2 of Exercise 16: “as in Definition 1 of” should be “as in Definition 2 of”

Page 385, line −12: “homogeneous coordinates. to” should be “homogeneous coordinates to”

Page 385, line −12: “treatment of \( \mathbb{P}^2(\mathbb{R}) \) Our” should be “treatment of \( \mathbb{P}^2(\mathbb{R}) \). Our”

Page 394, Exercise 7: “the map (2)” should be “the map (1)”

Page 394, part (b) of Exercise 8: “in the from” should be “in the form”

Page 399, line −4: “\( \psi \)” should be “\( \phi \)” in two places

Page 399, line −2: “\( (1 : a_1 : \cdots : a_n) \)” should be “\( \phi(a_1, \ldots, a_n) = (1 : a_1 : \cdots : a_n) \)”

Page 400, line 16: “in some projective variety” should be “for some projective variety”

Page 404, line 5: “\( 1 \leq i_1 < \)” should be “\( 0 \leq i_1 < \)”

Page 404, line 2 of Exercise 9: “\( f_i \in k[x_0, \ldots, x_n] \)” should be “\( f_j \in k[x_0, \ldots, x_n] \)”

Page 409, line 5: “decomposed to” should be “decomposed into”

Page 410, line −1: “\( k[x_1, \ldots, x_n] \)” should be “\( k[x_0, \ldots, x_n] \)”

Page 413, part (a) of Exercise 3, lines 2 and 3: “\( f = a_1 f_1 + \cdots + a_s f_s + r \). Prove that the 
quotients \( a_1, \ldots, a_s \)” should be “\( f = q_1 f_1 + \cdots + q_s f_s + r \). Prove that the 
quotients \( q_1, \ldots, q_s \)”

Page 413, part (a) of Exercise 3, line 3: “remainder \( r \)” should be “remainder \( r \)”

Page 414, part (b) of Exercise 13: “\( V \setminus V \cap V(g) \)” should be “\( V \setminus (V \cap V(g)) \)”

Page 416, line 2 of Lemma 5: “\( \text{LM}_{>h}(f^h) \)” should be “\( \text{LM}_{>h}(f^h) \)”

Page 416, line −4: “\( \text{LM}_{>h}(f^h) \)” should be “\( \text{LM}_{>h}(f^h) \)”

Page 417, equation (2): “\( \text{LM}_{>h}(g^h) \)” should be “\( \text{LM}_{>h}(g^h) \)”

Page 417, two lines below equation (2): “\( \text{LM}_{>h}(f^h) \)” should be “\( \text{LM}_{>h}(f^h) \)”

Page 419, second sentence of the proof of Theorem 8: The sentence should be “Applying 
the proof of part (i) of Proposition 7 with \( I \) in place of \( \text{I}_a(W) \) shows that \( Z \) is a 
projective variety containing \( W \).”

Page 423, line 16: “\( \mathbb{P}^1(\mathbb{C}) \times \mathbb{C} \) and you” should be “\( \mathbb{P}^1(\mathbb{C}) \times \mathbb{C} \), and you”
Page 425, first line following fourth display: “trivial solutions (0:0; y)” should be “trivial solutions (0, 0, y)”

Page 428, line −11: “Cramer’s Rule” should be “Cramer’s rule”

Page 429, line −1: “This proves \( f \in I(0) \cap \cdots \cap I^{(n)} \)” should be “This proves \( f \in I_n^{(0)} \cap \cdots \cap I_n^{(n)} \)”

Page 430, line 17: “Now suppose \( f \in I^{(i)} \)” should be “Now suppose \( f \in I_n^{(i)} \)”

Page 430, line 20: “\( f \in I(0) \cap \cdots \cap I^{(n)} \)” should be “\( f \in I_n^{(0)} \cap \cdots \cap I_n^{(n)} \)”

Page 431, line 2 of the proof of Proposition 8: “Then the proof of Proposition 7” should be “Then Proposition 7”

Page 432, line 2 after the proof of Proposition 10: “\( xy^2 - x + 1 \) is a Gröbner basis” should be “\( \{ xy^2 - x + 1 \} \) is a Gröbner basis”

Page 432, line −1: “point in \( \mathbb{P}^n \)” should be “point in \( \mathbb{P}^m \)”

Page 433, line 1 of the proof of Theorem 11: “The first has three parts” should be “The proof has three parts”

Page 433, line −12: “all have weight \( d \)” should be “are all weighted homogeneous of weight \( d \)”

Page 434, line −7: “there is a some” should be ”there is some”

Page 443, line below display (9): “\( \sigma \) suppose that” should be “suppose that”

Page 445, first display: “\( \begin{pmatrix} a_0 & a_1 & a_2 & a_3 \\ b_0 & b_1 & b_1 & b_3 \end{pmatrix} \)” should be “\( \begin{pmatrix} a_0 & a_1 & a_2 & a_3 \\ b_0 & b_1 & b_2 & b_3 \end{pmatrix} \)”

Page 446, line 9: “An straightforward” should be “A straightforward”

Page 446, line −3: “\( w_{ij} = \lambda w'_{ij} \)” should be “\( w'_{ij} = \lambda w_{ij} \)”

Page 447, line 5: “through two points” should be “through two distinct points”

Page 447, line 10: “are nonzero, and, hence, determine a line \( L \)” should be “are nonzero and distinct, and, hence, determine a unique line \( L \)”

Page 448, part (a) of Exercise 5: “\( \sum_{i,j=0}^n a_{ij}x_ix_j \)” should be “\( \sum_{i,j=0}^n a_{ij}x_ix_j \)”

Page 448, line 1 of Exercise 9: “be nonzero” should be “be nonzero with \( Q = (a_{ij}) \) symmetric”

Page 449, line 3 of Exercise 10: “set of all lines” should be “union of all projective lines”

Page 449, part (a) of Exercise 13: At the end of line 2, add “The image of \( F \) is called a projective line in \( \mathbb{P}^n \).”
Page 450, line 5: “V ⊆ P^4” should be “V ⊆ P^9”
Page 451, line 1: “lies is V(f)” should be “lies in V(f)”
Page 451, line 2: “all i” should be “for all i”
Page 451, line 4: “p =” should be “u =”
Page 451, line 5: “f(p) = 1” should be “f(u) = c_i”
Page 451, line 6: In two places, “g(p)” should be “g(u)”
Page 453, line −6: “nonzero” should be “nonconstant”
Page 453, line −2: “nonzero polynomial” should be “nonconstant polynomial”
Page 454, line 15: “irreducible factors f” should be “irreducible factors of f”
Page 456, line 7: “f = b_0z^m + · · ·” should be “f = a_0z^m + · · ·”
Page 456, line 8: “b_0 ∈ C \ {0}” should be “a_0 ∈ C \ {0}”
Page 464, part (a) of Exercise 5: “nonzero polynomial” should be “nonconstant polynomial”
Page 472, line 4 of part (b) of Exercise 4: Add “(This is a challenging exercise.)”
Page 481, lines −7 and −6: “It is easy to generalize this argument and show” should be “By using the discussion following Lemma 4, one can show”
Page 496, Exercise 7: “aHF_I(s) = aHP_I(s)” should be “aHF_R/I(s) = aHP_R/I(s)”
Page 496, part (c) of Exercise 10: “with Theorem 15 of Chapter 4, §3” should be “with Proposition 1 of §1”
Page 497, part (c) of Exercise 13: “Lemma 5 of §2” should be “Lemma 4 of §2”
Page 499, line 1: “an algebraically closed” should be “an algebraically closed field”
Page 505, part (a) of Exercise 11: “φ([f])” should be “φ([f])” (more space between [ and f)
Page 505, part (a) of Exercise 11: “f(p_1),” should be “f(p_1),” (more space between ( and f)
Page 506, part (a) of Exercise 14: “part (a) of the proposition” should be “part (i) of the proposition”
Page 506, part (b) of Exercise 14: “part (b) of the proposition” should be “part (ii) of the proposition”
Page 514, part (a) of Exercise 10: “If f_1, . . . , f_s ∈ k[x_1, . . . , x_n]” should be “If f, f_1, . . . , f_s ∈ k[x_1, . . . , x_n]”
Page 535, line -1: “$k \geq N$” should be “$i \geq N$”

Page 536, line 5: “$W \subset$” should be “$W \subseteq$”

Page 536, line 1 of Exercise 13: “$W \subset$” should be “$W \subseteq$”

Page 537, line 4 of part (d) of Exercise 14: “a curve $L \subseteq \Gamma$” should be “a curve $\tilde{L} \subseteq \Gamma$”

Page 537, hint to part (b) of Exercise 15: “$BL_0V$” should be “$Bl_0V$”

Page 537, part (b) of Exercise 16: “$g(q, tq) = 0$” should be “$g(tq, q) = 0$”

Page 537, part (c) of Exercise 16: “$g(q, tq) = 0$” should be “$g(tq, q) = 0$”

Page 549, part (a) of Exercise 7: “matrix $M_3$ in (3)” should be “matrix $M_3$ in (5)”

Page 549, line 2 of part (e) of Exercise 7: The line should be “$x > y > z$ and explain its relation to the matrix $N_2$ in Example 8.”

Page 559, line 21: “$HF_{S/\langle LT(G)\rangle}(m') < HF_{S/\langle LT(G)\rangle}(m')$” should be “$HF_{S/\langle LT(G)\rangle}(m') > HF_{S/\langle LT(G)\rangle}(m')$”

Page 564, line 3: “$-v^2 + \xi^2 - \zeta^2$” should be “$v^2 - \xi^2 + \zeta^2$”

Page 564, line 10: “$-u\eta^2 + v\zeta^2$” should be “$u\eta^2 - v\zeta^2$”

Page 564, line 12: “$-u\xi^2 + u\zeta^2 + v\eta^2$” should be “$u\xi^2 - u\zeta^2 - v\eta^2$”

Page 564, fourth display: “$-\xi^2\zeta^2 + \eta^4 + \zeta^4$” should be “$\xi^2\zeta^2 - \eta^4 - \zeta^4$”

Page 564, sixth display: “$-xz + y^2 + z^2$” should be “$xz - y^2 - z^2$”

Page 570, first display: On the left, “$\frac{\text{lcm}(\text{LM}(f_i), \text{LM}(f_j))}{\text{LT}(f_i)}$” should be “$\frac{\text{lcm}(\text{LM}(f_i), \text{LM}(f_j))}{\text{LT}(f_i)}$”

(two errors)

Page 578, line 3 of first display: “$xy$” should be “$-xy$”

Page 578, line -1: in two places, “$(xy)$” should be “$(-xy)$”

Page 579, line before last display: “$-xy + y^2$” should be “$xy + y^2$”

Page 582, line 2 of Example 6: “$f_2 = xy^2 - xy$” should be “$f_2 = xy^2 + xy$”

Page 582, first display of Example 6: “$-x(xy^2 - xy)$” should be “$-x(xy^2 + xy)$”

Page 582, line after first display of Example 6: “equal to $\text{LT}(f_1)$” should be “equal to $-\text{LT}(f_1)$”

Page 582, third display: “$s(g) = xe_2$” should be “$s(g) = -xe_2$”

Page 585, line above the second display: “$ye_1 - xe_1$” should be “$ye_1 - xe_2$”
Page 585, line below the second display: “s(h) = x^2 e_2 divides s(k)” should be “s(k) = x^2 e_2 divides s(h)”

Page 585, line below the second display: “a a” should be “a”

Page 586, first line of pseudocode: “f_i \in R” should be “f_i \in R, f_i monic”

Page 590, part (c) of Exercise 1: On the first line, “order on S” should be “order on R”

Page 590, part (c) of Exercise 1: On the second line, “>” should be “>_{POT}”

Page 590, part (b) of Exercise 2: Replace with “If we allow s-reductions and reduction by the syzygy h = (-f_2, f_1), then show that we can reduce g to (0, 0).”

Page 590, part (c) of Exercise 2: Replace with “Use Propositions 12 and 14 to explain why the computations in parts (a) and (b) are unnecessary.”

Page 591, line 10 of the pseudocode in Exercise 5: “<” should be “<_{POT}”

Page 597, line −10: “Cramer’s Rule” should be “Cramer’s rule”