Ideals, Varieties and Algorithms, *third edition*

Errata for the ***second*** *and subsequent printings as of November 29, 2012*

Page 15, line 2 of **Definition 1**: "f/g and h/k" should be "f/g and f'/g'"

Page 15, line 3 of **Definition 1**: "$kf = gh$" should be "$g'f = gf'$"

Page 27, Exercise 11.b: "part a" should be "part (a)"

Page 42, parts (i), (ii) and (iii) of **Proposition 6**: "GCD*(f,g)*" should be "GCD(f, g)" (parentheses in wrong font) (three errors)

Page 43, line 12: "$\deg(r) > \deg(r')$ or $r = 0$" should be "$\deg(r) > \deg(r')$ or $r' = 0$"

Page 47, line 1 of Exercise 14.b: "$(x - a_1)^{r_l}$" should be "$(x - a_1)^{r_1}$"

Page 52, line 1: "We rewrite the equations by subtracting the x_i terms from both sides" should be "We rewrite the equations by subtracting the x_i terms and constants from both sides"

Page 54, line -1: "Futhermore" should be "Furthermore"

Page 55, line 13: Add the sentence "A total order is also transitive, so that $x^\alpha > x^\beta$ and $x^\beta > x^\gamma$ always imply $x^\alpha > x^\gamma$."

Page 60, line 2 of Exercise 1: "$\text{LM}(\mathrm{f})$, $\text{LT}(\mathrm{f})$" should be "$\text{LM}(f)$, $\text{LT}(f)$"

Page 62, second display: "$-\mathrm{y} + 1$" should be "$-y + 1$"

Page 62, third display: The last three lines should be as follows (two errors):

$$\begin{array}{r} -y+1 \\ \underline{-y-1} \\ 2 \end{array}$$

Page 66, line 6: "$\text{LT}(p) < \text{LT}(f)$" should be "$\text{LT}(p) \leq \text{LT}(f)$"

Page 66, line 7: "$\text{multdeg}(a_i f_i) < \text{multdeg}(f)$" should be "$\text{multdeg}(a_i f_i) \leq \text{multdeg}(f)$"

Page 66, line 11: "30 years" should be "40 years"

Page 67, line 2: "$\text{LT}(f_i)$" should be "$\text{LT}(f_1)$"

Page 68, line 1 of Exercise 1: "order set" should be "ordered set"

Page 68, line 1 of Exercise 7: "$\langle f, f_2, f_3 \rangle = \langle x^4y^2 - z, x^4y^2 - z, x^3y^2 - z, x^3y^3 - 1, x^2y^4 - 2z \rangle$" should be "$\langle f_1, f_2, f_3 \rangle = \langle x^4y^2 - z, x^3y^3 - 1, x^2y^4 - 2z \rangle$" (multiple errors)

Page 69, Exercise 11.a: "$\beta \in \Delta_i$, if and only if $x^{\alpha(i)}$ divides x^β, but" should be "$\beta \in \Delta_i$ if and only if $x^{\alpha(i)}$ divides x^β and"

Page 72, first display: The comma at the end of the last line of the display should be a period.

Page 74, line 1 of Exercise 10: "$k[x_1, \ldots, x_n, \ldots, y_1, \ldots, y_n]$" should be "$k[x_1, \ldots, x_n, y_1, \ldots, y_n]$"

Page 74, line 4 of Exercise 11: "$\alpha >_{\mathrm{u}} \beta$" should be "$\alpha >_{\mathbf{u}} \beta$"

Page 74, line 1 of Exercise 11.c: "$u =$" should be "$\mathbf{u} =$"

Page 76, line -8: "$\langle \textsc{lt}(g_1), \ldots \textsc{lt}(g_t)\rangle$" should be "$\langle \textsc{lt}(g_1), \ldots, \textsc{lt}(g_t)\rangle$"

Page 77, line 1: "$\langle \textsc{lt}(g_1), \ldots \textsc{lt}(g_t)\rangle$" should be "$\langle \textsc{lt}(g_1), \ldots, \textsc{lt}(g_t)\rangle$"

Page 77, line -7: "$x^2 \in \langle(\textsc{lt}(I)\rangle$" should be "$x^2 \in \langle \textsc{lt}(I)\rangle$"

Page 78, line 1: "$A_{g_1} + B_{g_2}$" should be "$Ag_1 + Bg_2$"

Page 80, Exercise 4: "$\mathrm{LM}(g)$" should be "$\textsc{lm}(g)$"

Page 81, line 2 of Exercise 15: "$f_1 = f_2 = \cdots 0$" should be "$f_1 = f_2 = \cdots = 0$"

Page 82, line 1 of **Corollary 2**: "$\{g_t, \ldots, g_t\}$" should be "$\{g_1, \ldots, g_t\}$"

Page 85, line 6 of proof of **Theorem 6**: "$(g_1, \ldots, g_t)$" should be "$\langle g_1, \ldots, g_t\rangle$"

Page 88, line 2 of Exercise 10: Add the new sentence "Assume that f or g has at least two terms."

Page 88, line 1 of Exercise 10.b: "Deduce that" should be "Deduce that $S(f, g) \neq 0$ and that"

Page 88, line 4 of Exercise 11: The numerator of right side of the equation should be "$\mathrm{LCM}(x^\alpha \textsc{lm}(f), x^\beta \textsc{lm}(g))$"

Page 88, line 3 of Exercise 12.b: "Use part (a)" should be "Use Exercise 1"

Page 89, line 6: "Groebner basis for I" should be "Groebner basis for I"

Page 92, line 1 of **Definition 5**: "**A reduced**" should be "*A* **reduced**"

Page 95, line 5 of Exercise 10: "$g_i, \ldots, g_t$" should be "$g_1, \ldots, g_t$"

Page 95, line 1 of Exercise 10.b: "$g_i, \ldots, g_t$" should be "$g_1, \ldots, g_t$"

Page 97, line 3 of first display of **Example 3**: "$2x^2-$" should be "$2xy-$"

Page 99, line 2: "$t_i, \ldots, t_m$" should be "$t_1, \ldots, t_m$"

Page 103, line 5 of **Definition 1**: "$a_1g_1 + \cdots + a_tg_t$," should be "$a_1g_1 + \cdots + a_tg_t,\ \ a_i \in k[x_1,\ldots,x_n]$,"

Page 104, line 7: "$\geq$" should be "$\leq$"

Page 106, line -3: "$\dfrac{x^\gamma}{\mathrm{LM}(f_i)}\mathbf{e}_i - \dfrac{x^\gamma}{\mathrm{LM}(f_j)}\mathbf{e}_j$" should be "$\dfrac{x^\gamma}{\mathrm{LT}(f_i)}\mathbf{e}_i - \dfrac{x^\gamma}{\mathrm{LT}(f_j)}\mathbf{e}_j$"

Page 107, line -4: "of degree δ" should be "of multidegree δ"

Page 108, equation (5): "$\displaystyle\sum_i$" should be "$\displaystyle\sum_j$"

Page 108, line -3: "*Note:If*" should be "*Note: If*"

Page 109, line 1: "We leave it as an exercise to" should be "In Exercise 7, you will"

Page 110, lines 16 and 17: "we leave it as an exercise to" should be "in Exercise 9, you will"

Page 110, line -19: "that S is a" should be "that $\mathcal{S}$ is a"

Page 110, line -9: "S_{ik} and S_{ik}" should be "S_{ik} and S_{jk}"

Page 112, line -3: "from partial" should be "from part (a)."

Page 117, line 10: "$\mathrm{LT}(g) \in [x_{l+1},\ldots,x_n]$" should be "$\mathrm{LT}(g) \in k[x_{l+1},\ldots,x_n]$"

Page 119, line 2 of the paragraph beginning "Turning": "to x_l" should be "to x_1"

Page 122, line 10: "$\beta_i + \cdots + \beta_l$" should be "$\beta_1 + \cdots + \beta_l$"

Page 124, **Theorem 2**: "**Theorem 2.** *Given*" should be "**Theorem 2 (The Geometric Extension Theorem).** *Given*"

Page 124, line 2 of **Theorem 2**: "$\langle f_l, \ldots f_s\rangle$" should be "$\langle f_1,\ldots,f_s\rangle$" (two errors)

Page 128, line 7: "$V(I_1) =$" should be "$\mathbf{V}(I_1) =$"

Page 133, line -6: "$g_i(t_i,\ldots,t_m)x_i$" should be "$g_i(t_1,\ldots,t_m)x_i$"

Page 135, line 1 of Exercise 6.c: "only covers the" should be "only covers"

Page 136, parts (b) and (c) of Exercise 10: "part a" should be "part (a)" (two errors)

Page 136, line 3 of Exercise 11: "$k^m - V(g)$" should be "$k^m - \mathbf{V}(g)$"

Page 137, line 6 of Exercise 13: "$W = V(g)$" should be "$W = \mathbf{V}(g)$"

Page 139, line -10: "*let L be line*" should be "*let L be the line*"

Page 144, line -5: "$1688x^2$" should be "$688x^2$"

Page 148, Exercise 8.c: "has no singular points" should be "in $\mathbb{R}^2$ has no singular points when $a > 0$"

Page 149, line -6: "$(0, 17.4)$" should be "$(0, 17/4)$"

Page 150, line 1 of Exercise 20.b: "find the" should be "to find the"

Page 152, line -9: "$d \in k[x_1, \ldots, x_n]$" should be "$d \in k[x_2, \ldots, x_n]$"

Page 153, line -9: "over $\mathbb{Q}$," should be "over $\mathbb{Q}$." (the comma should be a period)

Page 155, large matrix in Definition 7: There are two large braces at the bottom of the matrix. Under the right-most brace (the ones under the columns with b_i coefficients), "m columns" should be "l columns"

Page 157, lines 19–21: Delete these lines and replace them with the following:
"where $c_0, \ldots, c_{m-1}, d_0, \ldots, d_{l-1}$ are unknowns in k. Equation (6) holds if and only if substituting these formulas into (6) gives an equality of polynomials. Comparing coefficients of powers of x, we conclude that (6) is equivalent to the following system of linear equations with unknowns c_i, d_i and coefficients a_i, b_i in k:"

Page 159, line -1: "$f_i \cdots f_r$" should be "$f_1 \cdots f_r$"

Page 163, statement of **Proposition 1**: In two places, "$Res(f, g, x_1)$" should be "$\mathrm{Res}(f, g, x_1)$" (two errors)

Page 166, line 1 of Exercise 2: "Let $f, g \in \mathbb{C}[x, y]$." should be "Let $f, g \in \mathbb{C}[x, y]$ be nonzero."

Page 166, line 1 of Exercise 2.b: "$[x, y]$" should be "$\mathbb{C}[x, y]$"

Page 166, line 1 of Exercise 3: "$(f, g) \cap k[y]$" should be "$\langle f, g \rangle \cap k[y]$"

Page 167, last line of Exercise 8: "Exercise 11" should be "Exercise 10"

Page 167, first display of Exercise 10.a: "$\mathrm{Res}(f(x_1, \mathbf{c}), g(x_1, \mathbf{c}, x_1)$" should be
"$\mathrm{Res}(f(x_1, \mathbf{c}), g(x_1, \mathbf{c}), x_1)$"

Page 172, line -3: "(x^n, y^m)" should be "$\langle x^n, y^m \rangle$"

Page 174, line 3 of part (a) of Exercise 7: "$a_1 x^{n-1}$" should be "$a_1 x^{n-1} y$"

Page 180, line 1: "*the principal ideal*" should be "*be the principal ideal*"

Page 181, line -4: The left side of the equation should be "$\dfrac{\partial f}{\partial x_j}$"

Page 183, line 3 of **Proposition 2**: "$\langle f_1, \ldots, f_r)$ and $\langle g_1, \ldots, g_s)$" should be "$\langle f_1, \ldots, f_r\rangle$ and $\langle g_1, \ldots, g_s\rangle$"

Page 184, line 2: "$(f_1, \ldots, f_r, g_1, \ldots, g_s)$" should be "$\langle f_1, \ldots, f_r, g_1, \ldots, g_s\rangle$"

Page 184, line 6: "$\mathbb{R}^3$" should be "$\mathbb{R}[x, y, z]$"

Page 186, line 3 of the proof of **Proposition 9**: "by any" should be "be any"

Page 192, line 2 of Exercise 13: "$y \in K^n$" should be "$y \in k^n$"

Page 192, line 1 of Exercise 13.b: "is an ideal" should be "is an ideal in"

Page 192, Exercise 14.d: Add a comma before "with equality"

Page 192, Exercise 15.b: Replace with "$\alpha_A^{-1}(I' + J') \supset \alpha_A^{-1}(I') + \alpha_A^{-1}(J')$, with equality if α_A is onto."

Page 192, Exercise 15.c: Replace "with equality if the right-hand side contains K" with "with equality if α_A is onto and the right-hand side contains K"

Page 193, paragraph following **Definition 2**: In three places, "$I(\overline{S})$" should be "$\mathbf{I}(\overline{S})$", and in three other places, "$I(S)$" should be $\mathbf{I}(S)$" (6 errors total)

Page 197, Exercise 3: "radical ideal," should be "radical,"

Page 197, Exercise 7.a: "$I \supset K$ where $K = \ker(\alpha_A)$" should be "$I \supset \ker(\alpha_A)$ and α_A is onto"

Page 201, line 10: "$(p \circ F) = 0$" should be "$(q \circ F) = 0$"

Page 208, line -1: "$W :$" should be "$W =$"

Page 209, Exercise 5.a: "$W = V(f)$" should be "$W = \mathbf{V}(J)$"

Page 210, line 3 of Exercise 9: "$(f_1 f_2 \cdots f_r)$" should be "$\langle f_1 f_2 \cdots f_r\rangle$"

Page 220, line 5: "$V \in \mathbb{C}^3$" should be "$V \subset \mathbb{C}^3$"

Page 221, line 1 of Exercise 4.b: "$\phi^{-1}(a, b)$" should be "$\pi^{-1}(a, b)$"

Page 226, line -9: "$[j] + [k] = J/I$" should be "$[j] + [k] \in J/I$"

Page 229, line 2 of Exercise 10: "(x^2)" should be "$\langle x^2\rangle$"

Page 234, line -18: "(ii) $\Rightarrow$ (iii)" should be "(ii) $\Leftrightarrow$ (iii)"

Page 234, line -17: "$g \in G$" should be "$g \in G\rangle$"

Page 234, line -10: "(iv) $\Rightarrow$ (v)" should be "(iv) $\Leftrightarrow$ (v)"

Page 236, lines -12 and -10: "Corollary 7" should be "Proposition 7" (two errors)

Page 237, Exercise 9: Replace the entire exercise with the following:

9. Suppose that $I \subset \mathbb{C}[x_1, \ldots, x_n]$ is a radical ideal with a Groebner basis $f_1, \ldots, f_n$ such that $\text{LT}(f_i) = x_i^{m_i}$ for each i. Prove that $\mathbf{V}(I)$ contains *exactly* $m_1 \cdot m_2 \cdots m_n$ points.

Page 240, part (iii) of **Proposition 3**: "$\mathbf{I}_V(V_V(J))$" should be "$\mathbf{I}_V(\mathbf{V}_V(J))$"

Page 240, part (iv) of **Proposition 3**: "$\mathbf{V}_V(I_V(W))$" should be "$\mathbf{V}_V(\mathbf{I}_V(W))$"

Page 256, line 3 of Exercise 4: "$W \subset k$" should be "$W \subset \mathbb{R}$"

Page 256, line 4 of Exercise 4: "$k - W$" should be "$\mathbb{R} - W$"

Page 262, line 3: "$\mathbf{V}(I_l) - W_1$" should be "$\mathbf{V}(I_l) - W_l$" and in two places, "$\pi_1(V - W_0)$" should be "$\pi_l(V - W_0)$" (three errors total)

Page 262, line 19: "$V_1' \not\subset V_i$" should be "$V_1' \not\subset V_i'$"

Page 263, line 9: "Exercises 7" should be "Exercise 7"

Page 263, line 15: "$\pi_1(V)$" should be "$\pi_l(V)$"

Page 264, line 1: "$\pi_1(V) \notin W$" should be "$\pi_1(V) \not\subset \widetilde{W}$" (two errors)

Page 264, line 3: "$u_r \in I_1$" should be "$u_r \notin I_1$"

Page 274, line -6: "explict" should be "explicit"

Page 277, line 1 of Exercise 3.a: "trignomometric" should be "trigonometric"

Page 287, line 8: "researach" should be "research"

Page 287, line 1 of Exercise 2.b: "solutons" should be "solutions"

Page 288, line 7 of Exercise 7: "for l" should be "for I"

Page 308, line -16: "While" should be "WHILE"

Page 321, line 7: "*elementary symmetric polynomials*" should be "*elementary symmetric functions*"

Page 326, line 1 of Exercise 13: "total degree k" should be "total degree d"

Page 326, line 2 of Exercise 13.a: "$k = i_1 + 2i_2 + \cdots + ni_n$" should be "$d = i_1 + 2i_2 + \cdots + ni_n$"

Page 329, line 4 of the proof of **Proposition 6**: "This proves (ii)" should be "This proves (i) and (ii)"

Page 334, line 1 of part (c) of Exercise 6: "(xyz)" should be "$\langle xyz \rangle$"

Pages 338–339, proof of **Theorem 5**: The proof uses k to denote both the field and the total degree of the invariants being considered. This degree should be changed to ℓ as follows:

Changes on Page 338:

line 2: "$\frac{1}{2}(x^2 - y^2)$" should be "$\frac{1}{2}(x^2 + y^2)$"
line -12: "integer k" should be "integer "ℓ"
line -11: "k into" should be "ℓ into"
line -8: "$(x_1 + \cdots + x_n)^k$" should be "$(x_1 + \cdots + x_n)^\ell$"
line -7: "$|\alpha| = k$" should be "$|\alpha| = \ell$"
line -6: The display should read "$(x_1 + \cdots + x_n)^\ell = \sum_{|\alpha|=\ell} a_\alpha x^\alpha$"
line -5: "$|\alpha| = k$" should be "$|\alpha| = \ell$"
line -3: "$\alpha_1 = (\alpha_1, \ldots, \alpha_n)$" should be "$\alpha = (\alpha_1, \ldots, \alpha_n)$"

Changes on Page 339:

line 5: The display should read "$(u_1 A_1 \cdot \mathbf{x} + \cdots + u_n A_n \cdot \mathbf{x})^\ell = \sum_{|\alpha|=\ell} a_\alpha (A \cdot \mathbf{x})^\alpha u^\alpha$"
lines 7 and 8: On the left side of this two-line display, S_k should be S_ℓ and the exponent of $(u_1 A_1 \cdot \mathbf{x} + \cdots + u_n A_n \cdot \mathbf{x})$ should be ℓ instead of k, and on the right side of the display, two of the summations should be over $|\alpha| = \ell$ instead of over $|\alpha| = k$.
line 10: This line should begin with ℓ, not k.
line 12: "k-th power sum S_k" should be "ℓ-th power sum S_ℓ"
line 14: "$S_k = S_k$" should be "$S_\ell = S_\ell$"
line 15: "S_k" should be "S_ℓ"
line 17: "$S_k =$" should be "$S_\ell =$"
line 19: The summation on the left should be over $|\alpha| = \ell$ instead of over $|\alpha| = k$.

Page 341, line 4 of the statement of **Proposition 7**: "$k[x_1, \ldots, x, y_1, \ldots, y_m]$" should be "$k[x_1, \ldots, x_n, y_1, \ldots, y_m]$"

Page 343, line 3 of Exercise 5.a: "$k[f_1, \ldots, x_n] \subset k[x_1, \ldots, x_n]^G$" should be "$k[f_1, \ldots, f_m] \subset k[x_1, \ldots, x_n]^G$"

Page 343, line 1 of Exercise 5.c: "total degree k" should be "total degree d"

Page 343, line 3 of Exercise 5.d: "degree k" should be "degree d"

Page 343, line 2 of Exercise 5.e: "total degree $< k$" should be "total degree $< d$"

Page 352, line 9: "$J_F \cap k(x_i, \ldots, x_n, y_1, \ldots, y_m]$" should be "$J_F \cap k[x_i, \ldots, x_n, y_1, \ldots, y_m]$"

Page 353, second display: Insert space after "if" in two places so that the display ends with:

$$= \begin{cases} 0 & \text{if } A \cdot \mathbf{a} \neq \mathbf{a} \\ f(\mathbf{a}) \neq 0 & \text{if } A \cdot \mathbf{a} = \mathbf{a} \end{cases}$$

Page 354, Exercise 2: "$f_1, \ldots, f_m, \in k[x_1, \ldots, x_n]$" should be "$f_1, \ldots, f_m \in k[x_1, \ldots, x_n]$"

Page 361, line −11: "dividing by x" should be "dividing by x"

Page 366, line 4 of Exercise 3.c: "part(b)" should be "part (b)"

Page 371, line 10: "$V(x_0)$" should be "$\mathbf{V}(x_0)$"

Page 373, line 1 of part (iv) of **Proposition 7**: "$F\ (x_0, \ldots, x_n)$" should be "$F(x_0, \ldots, x_n)$" (remove the extra space following F)

Page 373, line 4 of **Example 8**: "know that W" should be "know that W"

Page 376, line 1 of Exercise 6.d: "$U_{i_1}, \cap \ldots \cap U_{i_s}$" should be "$U_{i_1} \cap \cdots \cap U_{i_s}$" (two errors)

Page 376, line 2 of Exercise 6.d: "$< i \leq n$" should be "$< i_s \leq n$"

Page 380, line 2 of **Proposition 4**: "$\in \mathbf{V}$" should be "$\in V$"

Page 386, Exercise 6.b: "$I_l \cap \cdots \cap I_l$" should be "$I_1 \cap \cdots \cap I_l$"

Page 386, line 7 of Exercise 10: "$\langle x_0, \ldots, x_0 \rangle$" should be "$\langle x_0, \ldots, x_n \rangle$"

Page 386, line 2 of Exercise 11.b: "I is prime" should be "I is prime" (wrong font)

Page 388, line −4: "$f_j \in I$," should be "$f_j \in I$." (the comma should be a period)

Page 391, line 2 of Exercise 2: "$k[x_0, \ldots, x_0]$" should be "$k[x_0, \ldots, x_n]$"

Page 392, line 2 of Exercise 7: "$k[x_0, \ldots, x_0]$" should be "$k[x_0, \ldots, x_n]$"

Page 392, line 1 of Exercise 11.b: "part a" should be "part (a)"

Page 394, line −17: "of x does" should be "of x does"

Page 394, line −4: "and y is" should be "and y is"

Page 398, line 7: "for all i" should be "for all i"

Page 398, line 2 of **Theorem 6**: "$\mathbf{V}(F_1, \ldots, F_s) \in$" should be "$\mathbf{V}(F_1, \ldots, F_s) \subset$"

Page 403, line −7: "$\langle f_s^h, \ldots, f_s^h \rangle$" should be "$\langle f_1^h, \ldots, f_s^h \rangle$"

Page 407, line 3 of Exercise 11: "$\{F^i : F \in I\}$" should be "$\{F^{(i)} : F \in I\}$"

Page 412, line −8: "$\mathbf{V}(x - z) \cap \mathbf{V}(x + z)$" should be "$\mathbf{V}(x - z) \cup \mathbf{V}(x + z)$"

Page 415, line 18: "image of F" should be "image of σ"

Page 421, line 6 of Exercise 13.c: "v_1" should be "v_i"

Page 441, line 17: "$|J|$denote" should be "$|J|$ denote" (insert space)

Page 441, line −9: "$W' = V(x_{k_1}, \ldots, x_{k_s})$" should be "$W' = \mathbf{V}(x_{k_1}, \ldots, x_{k_s})$"

Page 447, line 8 of the proof of **Proposition 2**: "$\{i_1, \ldots, i_r)$" should be "$\{i_1, \ldots, i_r\}$"

Page 448, line 14: "$x^\alpha x_n^j \in I$" should be "$x^\alpha x_n^j \notin I$"

Page 451, line 2: "$T_j^s \cap T_j^s$" should be "$T_i^s \cap T_j^s$"

Page 451, first line of first display: "C_I" should be "C_1"

Page 451, line −19: "degree less $\leq s$" should be "degree $\leq s$"

Page 454, line −3: "$[e_{j_1}, \ldots, e_{J_r}]$" should be "$[e_{j_1}, \ldots, e_{j_r}]$"

Page 454, line −2: "$\sum_{i \notin \{j_i, \ldots, j_r\}}$" should be "$\sum_{i \notin \{j_1, \ldots, j_r\}}$"

Page 457, line −7: "subpace" should be "subspace"

Page 462, line −1: "$HF_I(S)$" should be "$HF_I(s)$"

Page 463, line 8 of proof of **Proposition 9**: "$\mathrm{LM}(f_1)$" should be "$\textsc{lm}(f_1)$"

Page 463, last display: "$HF_I(S)$" should be "$HF_I(s)$"

Page 470, line 14: "had degree" should be "has degree"

Page 470, line 18: "Theorem 8" should be "Theorem 11"

Page 472, lines −2 and −1: "By Theorem 15 of Chapter 4, §3" should be "It is easy to show that"

Page 473, line 15: "subspace is contained" should be "subspace contained"

Page 476, line 7: "projective variety is then defined" should be "projective variety V is defined"

Page 480, line −10: "$H - W \subset (V)$" should be "$H - W \subset \pi(V)$"

Page 481, line −8: "the the" should be "the"

Page 489, line 4 of **Example 5**: "$(f_1, f_2) = (x + y + z, x^2 - y^2z^2 + z^3)$" should be "$\langle f_1, f_2 \rangle = \langle x + y + z, x^2 - y^2z^2 + z^3 \rangle$" (four errors)

Page 489, line 6 of **Example 5**: "$I(C) = (f_1, f_2)$" should be "$\mathbf{I}(C) = \langle f_1, f_2 \rangle$" (three errors)

Page 489, line 12 of **Example 5**: "rank $(J_p(f_1, f_2))$" should be "$\mathrm{rank}(J_p(f_1, f_2))$"

Page 496, line −9: "$f_{p.j}$" should be "$f_{p,j}$"

Page 496, line −2: "$f_{p.min}$" should be "$f_{p,min}$"

Page 523, line -5: "denote $\sqrt{-1}$." should be "denote $\sqrt{-1}$)."

Page 531, line -6: "dicussion" should be"discussion"

Page 532, line -8: "Sturmfels (1991)" should be "Sturmfels (1993)"

Page 533, line -13: "$\mathrm{LCM}\,\textsc{lt}(f_i), \textsc{lt}(f_j))$" should be "$\mathrm{LCM}(\textsc{lt}(f_i), \textsc{lt}(f_j))$"

Page 542, index entry for closure, projective: "386" should be "389"

Page 545, index entry for ideal, sum of: "185" should be "183"