

Page 55, line 1 of paragraph beginning “To begin”: “sum of monomials” should be “sum of monomials times coefficients”

Page 57, line 2 of the proof of part (ii) of Proposition 4: delete the sentence “But $\dots = x^{\beta+\gamma}$.”

Page 62, line 11: “monomial” should be “monomial times coefficient”

Page 73, line 9: “ $\langle x^\alpha : \alpha \in A \rangle$ ” should be “ $\langle x^\alpha \mid \alpha \in A \rangle$ ”

Page 79, line 13: “ $\langle g_1, g_2 \rangle$ ” should be “ $\{g_1, g_2\}$ ”

Page 86, line 1: “a sum of S -polynomials” should be “a k -linear combination of S -polynomials”

Page 94, line –16: “Proposition 5” should be “Theorem 5”

Page 96, line 4 of part (b) of Exercise 10: “ $x_\ell D - x_s D$ ” should be “ $x_\ell C - x_s D$ ”

Page 108, line following the first display: “ $x^{\gamma_{ij}} = \text{lcm}(\text{LM}(g_j), \text{LM}(g_l))$ ” should be “ $x^{\gamma_{ij}} = \text{lcm}(\text{LM}(g_i), \text{LM}(g_j))$ ”

Page 115, line –8: “If follows” should be “It follows”

Page 134, line –2: “Lemma 1 of §2” should be “Lemma 1 of §2 (which holds for any infinite field k)”

Page 139, line 6: “ $f_1(\mathbf{a})/g_1(\mathbf{a})$ ” should be “ $f_1(\mathbf{a})/g_1(\mathbf{a})$ ”

Page 160, line 3 of Exercise 5: “polynomials the specialize” should be “polynomials that specialize”

Page 161, first display: The period at the end of the line should be a comma.

Page 167, line following (7): “ $x_1\text{-deg}(f) = m$ and $x_1\text{-deg}(g) = l$ ” should be “ $\text{deg}(f, x_1) = m$ and $\text{deg}(g, x_1) = l$ ”

Page 168, part (i) of **Corollary 7**: “ $k[x_1]$ ” should be “ $\mathbb{C}[x_1]$ ”

Page 171, line 2 of part (d) of Exercise 9: “Explain” should be “Assuming that the zero polynomial has degree 0, explain”

Page 177, line –4: “ $\{g_1, \dots, g_s\}$ ” should be “ $G = \{g_1, \dots, g_s\}$ ”

Page 186, third display: “ $(f_1 f_2 \cdots f_r)^N$ ” should be “ $c(f_1 f_2 \cdots f_r)^N$ ”

Page 191, first display: “ $\mathbf{V}(f_i g_j, 1 \leq i \leq r, 1 \leq j \leq s)$ ” should be “ $\mathbf{V}(f_i g_j \mid 1 \leq i \leq r, 1 \leq j \leq s)$ ”

Page 200, line 13: “is Thus” should be “Thus”

Page 234, line 5 of **Definition 1**: “n-tuple” should be “ n -tuple”

Page 271, third line of first display: The comma at the end of the line should be a period.

Page 273, first line of first display: The period at the end of the line should be a comma.

Page 277, line 2 of part (a) of Exercise 14: “ $\mathbf{V}_W(a^2 - b^2 + 4)$ ” should be “ $\mathbf{V}_W(y^2 - z^2 + 4)$ ”

Page 280, line 1 of the proof of **Theorem 4**: “(i) \Leftrightarrow (iii)” should be “(i) \Leftrightarrow (ii)”

Page 283, line 2: “ $x_1 > \dots > x_n > y_1 > \dots > y_m$ ” should be “ $x_1 > \dots > x_n > y_1 > \dots > y_m$ ” (two errors)

Page 283, line -11: “ $\mathbf{V}(I_j)$ ” should be “ $\mathbf{V}(I_i)$ ”

Page 334, line 3 of Exercise 17: “ C' ” should be “ C'' ”

Page 372, part (b) of Exercise 11: “ $x^2y - xy^3$ ” should be “ $x^3y - xy^3$ ”

Page 391, line 1: “canvas“” should be “canvas””

Page 400, lines -4 and -3: “ x_1, \dots, x_n ” should be “ x_1, \dots, x_n ”

Page 411, first display: “ $k[x_1, \dots, x_n]$ ” should be “ $k[x_0, \dots, x_n]$ ”

Page 411, line 4 of second display: “ $k[x_1, \dots, x_n]$ ” should be “ $k[x_0, \dots, x_n]$ ”

Page 460, line -2: “ $\ell_{pg} = 0$ ” should be “ $\ell_{pg} = 0$ ”

Page 473, line 11: “ $\langle m_i$ ” should be “ $\langle m_1$ ”

Page 495, lines 13, 14 and 20: The subscript “ I^h ” should be “ S/I^h ”

Page 498, part (b) of Exercise 18: “ HF_I ” should be “ $HF_{S/I}$ ”

Page 498, part (b) of Exercise 18: in two places, “ aHF_I ” should be “ ${}^aHF_{S/I}$ ”

Page 502, line -2: “by Proposition 6” should be “By Proposition 6”

Page 502, line -1: $\deg({}^aHP_{IJ})$ ” should be $\deg({}^aHP_{R/IJ})$ ”

Page 507, line 10: “as s gets” should be “as s gets”

Page 514, line 1 of part (a) of Exercise 10: “ f, f_1, \dots, f_s ” should be “ f, f_1, \dots, f_r ”

Page 517, line 11: “ $\frac{\partial f}{\partial x_1}$ ” should be “ $\frac{\partial f}{\partial x_1}$ ”

Page 518, line 2: “If follows” should be “It follows”

Page 522, line 9: $\mathbf{V}(f_i) \cup \mathbf{V}(f_j)$ ” should be $\mathbf{V}(f_i) \cup \mathbf{V}(f_j)$ ”

Page 533, line 1: “ $k \rightarrow \infty$ ” should be “ $i \rightarrow \infty$ ”

Page 534, line 5 of Exercise 1: “where $\frac{\partial^{\alpha_i}}{\partial x_1^{\alpha_i}}$ ” should be “where $\frac{\partial^{\alpha_i}}{\partial x_1^{\alpha_i}}$ ”

Page 541, line 3 of paragraph beginning “Our next proposition”: “is used),” should be “are used),”

Page 541, line –8: Replace “So by the remark ... in the second case,” with “In the second case, the remark following Definition 1 implies that”

Pages 545 and 546: **Example 6** uses lex order with $x > y$. However, to be consistent with Theorem 5, we need to use a graded order. Fixing this requires several changes in the example as follows:

Line 1 of **Example 6**: “ $I = \langle x^2 + y^2 - 1, x + y^2 - 2 \rangle$ in $\mathbb{Q}[x, y]$, using lex” should be “ $I = \langle x^2 + 1, xy + 1 \rangle$ in $\mathbb{Q}[x, y]$, using grlex”

Line 3 of **Example 6**: “ $J = \langle x^2 + y^2 - z^2, xz + y^2 - 2z^2 \rangle$ ” should be “ $J = \langle x^2 + z^2, xy + z^2 \rangle$ ”

Lines 4 and 5 of **Example 6**: Delete the sentence “But ... homogenizing variable.”

First display of **Example 6**: Replace with “ $G = \{x^2 + z^2, xy + z^2, y^2z^2 + z^4, xz^2 - yz^2\}$ ”

Second display of **Example 6**: Replace with “ $G^d = \{x^2 + 1, xy + 1, y^2 + 1, x - y\}$ ”

Line –2 of **Example 6**: “third and fourth polynomials are divisible by $\text{LT}(x + y^2 - 2) = x$ ” should be “first and second polynomials are divisible by $\text{LT}(x - y) = x$ ”

Line –1 of **Example 6**: “reduced lex Gröbner basis for I is $\{y^4 - 3y^2 + 3, x + y^2 - 2\}$ ” should be “reduced grlex Gröbner basis for I is $\{y^2 + 1, x - y\}$ ”

Page 548, line 2 of Exercise 3: “for all g ” should be “for all $g \in G$ ”

Page 551, line –17: “studied in §2 of” should be “studied in §8 of”

Page 553, line 3 of **Example 3**: “ $m \geq 0$ ” should be “ $m \geq 2$ ”

Page 563, line 3: “ $\xi^{d_i r}$ ” should be “ $\xi_i^{d_i r}$ ”

Page 563, line –2: “the initial terms” should be “The initial terms”

Page 564, line 1: “ $\Delta = 4 - 3 = 1$ ” should be “ $\Delta = 13 - 12 = 1$ ”

Page 570, lines 2 and 3 of part (ii) of procedure ComputeM: “contains a product $x^\alpha f_\ell$ whose leading monomial equals x^β ” should be “contains a product $x^\alpha f_\ell$ whose leading monomial divides x^β ”

Page 571, line 12: “according the monomial” should be “according to the monomial”

Page 573, line 12: “an *standard*” should be “a *standard*”

Page 573, line 13: “ G_{new} ” should be “ G_{new} ”

Page 573, lines 10 and 11 of **Example 3**: “monomials in $\text{Mon}(H)$ whose leading terms are” should be “monomials in $\text{Mon}(H)$ which are”

Page 576, line 3: “ G_{old} ” should be “ G_{old} ”

Page 576, line 6: “ G_{new} ” should be “ G_{new} ”

Page 578, line –7: “in (5)” should be “in (4)”

Page 579, line 3: “ $(xy + z, x^2)$ ” should be “ $(-xy + z, x^2)$ ”

Page 579, line 5 of **Example 2**: “include f_3 ” should be “include $f_3 = S(f_1, f_2)$ ”

Page 579, line 7 of **Example 2**: “the $-\mathbf{e}_2$ ” should be “ $-\mathbf{e}_2$ ”

Page 579, line –5: “the $x\mathbf{e}_2$ ” should be “ $x\mathbf{e}_2$ ”

Page 583, line –11: “same leading term” should be “same signature”

Page 585, line 2: “ $\mathfrak{s}(x^\gamma \mathbf{k}) = \mathfrak{s}(\mathbf{h})$ ” should be “ $\mathfrak{s}(cx^\gamma \mathbf{k}) = \mathfrak{s}(\mathbf{h})$ for suitable c and x^γ ”

Page 585, lines 3 and 4: In two places, “ $\mathbf{h} - x^\gamma \mathbf{k}$ ” should be “ $\mathbf{h} - cx^\gamma \mathbf{k}$ ”

Page 585, line 7: “ $f_2 = xy - z$. and” should be “ $f_2 = xy - z$, and”

Page 585, line 2 of the proof of **Proposition 15**: “is smaller” should be “is smaller than $\mathfrak{s}(\mathbf{h})$ ”

Page 587, second paragraph: Replace the third sentence and fourth sentences with the sentences below:

We will follow the discussion from section 7.1 of EDER and FAUGÈRE (2014). If $\mathbf{f} \in \mathbf{G} \cup \mathbf{S}$ and a is a monomial in R , then $a\mathbf{f}$ is said to be a *rewriter* in signature M if $\mathfrak{s}(a\mathbf{f})$ divides M . A rewriter in signature M of maximal signature is called a *canonical rewriter* in signature M . An element $a\mathbf{f}$ with $\mathbf{f} \in \mathbf{G} \cup \mathbf{S}$ and a a monomial in R is *rewritable* if \mathbf{f} is *not* a canonical rewriter in signature $M = \mathfrak{s}(a\mathbf{f})$. That is, $a\mathbf{f}$ is rewritable if there is some $\mathbf{f}' \in \mathbf{G} \cup \mathbf{S}$ such that $\mathfrak{s}(\mathbf{f}')$ divides $\mathfrak{s}(a\mathbf{f})$, but $\mathfrak{s}(\mathbf{f}') > \mathfrak{s}(\mathbf{f})$. Assuming the signature of \mathbf{g} comes from a term $a\mathbf{f}$ as here, the Criterion function tests for the existence of such an \mathbf{f}' and returns `true` if there is one, so that $a\mathbf{f}$ is rewritable. It is not necessary to compute the reduction of \mathbf{g} in this case, by the two propositions. Our Criterion is a simplified version of the Rewritable function (Algorithm 4) in EDER and FAUGÈRE (2014). That actually goes farther and tests both “halves” of an S-pair for rewritability, based on further optimizations of this approach (see their Lemma 7.6).

Page 587, third line of second display: “ \mathbf{e}_2 ” should be “ \mathbf{e}_2 ”

Page 588, after first sentence at top of page: Add:

At this point, $\mathbf{G} \cup \mathbf{S}$, which consists of $\mathbf{e}_1, \mathbf{e}_2$ and the original Koszul syzygies, contains no \mathbf{f}' such that $\mathfrak{s}(\mathbf{f}')$ divides $\mathfrak{s}(\mathbf{g}) = -y\mathbf{e}_2$, but for which $\mathfrak{s}(\mathbf{f}') > -y\mathbf{e}_2$. So the Criterion function returns the value `false`.

Page 590, **Exercise 3**: “Definition 10” should be “Definition 9”

Page 596, line -3: At the end of the display, “ $+a_{13}a_{22}a_{31}$ ” should be “ $-a_{13}a_{22}a_{31}$ ”

Page 632, reference “D. Mumford”: “cCorrected” should be “Corrected”