Ideals, Varieties and Algorithms, *fourth edition*, corrected publication 2018

Errata for the corrected publication as of October 3, 2024

Page xv, line −1: "cartesian product" should be "Cartesian product"

Page 49, line 2: "affine algebraic varieties" should be "affine varieties"

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 $\ldots = x^{\beta+\gamma}$."

Page 62, line 11: "appropriate monomial and subtracting. Then this monomial becomes" should be "appropriate term (monomial times coefficient) and subtracting. Then this term becomes"

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 100, line below display (3): "an algebraic variety" should be "a variety"

Page 103, line 1 of Exercise 8: "algebraic varieties" should be "varieties"

Page 103, line 2 of part b of Exercise 9: "affine algebraic curve" should be "affine curve"

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

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 141, line 1 of part (b) of Exercise 10: "$f_1 \ldots, f_n$" should be "$f_1, \ldots, f_n$"

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-deg$(f) = m$ and x_1-deg$(g) = l$" should be "deg$(f, x_1) = m$ and 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: "$\{g_1, \ldots, g_s\}$" should be "$G = \{g_1, \ldots, g_s\}$"

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 276, first and second lines of first display: Add a comma at the end of the line.

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: "$x_1 > \ldots > x_n > y_1 > \ldots > y_m$" should be "$x_1 > \cdots > x_n > y_1 > \cdots > y_m$" (two errors)

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

Page 291, line 4: "algebraic varieties" should be "affine varieties"

Page 301, line following second display: ""algebraic variety" should be "affine variety"

Page 317, line 1 of Exercise 16: "three joints" should be "three revolute joints"

Page 330, line -4: "reducible" should be "irreducible"

Page 332, line 1 of Exercise 11: "reducible" should be "irreducible"

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

Page 353, display of Exercise 8: Add a period at the end of the line.

Page 355, Exercise 17: "$s_1 \ldots, s_4$" should be "$s_1, \ldots, s_4$"

Page 360, line -9: Add a period at the end of the display.

Page 363, line 4 of Exercise 13: "$k[u, v, w])$" should be "$k[u, v, w]$"

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

Page 373, line 10: "$\sigma_1, \ldots \sigma_n$" should be "$\sigma_1, \ldots, \sigma_n$"

Page 391, line 1: " "canvas" " should be " "canvas" "

Page 397, line 1 of **Corollary 3**: "$i = 0, \ldots n,$" should be '$i = 0, \ldots, n,$"

Page 400, lines -4 and -3: "$x_1, \ldots x_n$" should be "$x_1, \ldots, x_n$" (error appears on each line)

Page 411, first display: "$k[x_1, \ldots, x_n]$" should be "$k[x_0, \ldots, x_n]$"

Page 411, line 4 of second display: "$k[x_1, \ldots, x_n]$" should be "$k[x_0, \ldots, x_n]$"

Page 420, three bottom lines: These lines should not be indented.

Page 423: Remove the blank line between lines 2 and 3. **Example 1** does not end here.

Page 423: paragraph beginning "We will use the following general framework": Insert a blank line before this paragraph to indicate the end of **Example 1**.

Page 431, lines 2–5 of the proof of Proposition 8: Do not indent these lines.

Page 434, line 5: "$\mathbf{V}(J) \subset$" should be "$\mathbf{V}(J) \subseteq$"

Page 438, second line of display (4): Add a comma at the end of the line.

Page 441, display in **Proposition 6**: Change the period at the end of the line to a comma.

Page 449, line -1: Add a period at the end of the sentence.

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

Page 461, lines 1, 5 and 8: "$(0, 0, 1)$" should be "$(0{:}0{:}1)$" (error occurs once on each of these lines)

Page 461, fourth display: Add a comma at the end of the display.

Page 466, first two lines of the first display of Exercise 13: Add a comma at the end of each line.

Page 469, line 4 of §1: "(so $H_x = \mathbf{V}(x)$)" should be "[so $H_x = \mathbf{V}(x)$]"

Page 470, line -2: "the dimension of" should be "the **dimension** of"

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

Page 483, lines 3 and 4 of part d of Exercise 4: "(where a ... some $j \neq i$)" should be "[where a ... some $j \neq i$]"

Page 486, line 4 of the proof of **Proposition 1**: "$v_{m+1}, \ldots v_{m+n}$" should be "$v_{m+1}, \ldots, v_{m+n}$"

Page 493, line 1 of **Definition 10**: "$V \subset$" should be '$V \subseteq$"

Page 495, lines 13, 14 and 20: The subscript "I^h" should be "S/I^h" (same error on each line)

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: "$f, f_1, \ldots, f_s$" should be "$f, f_1, \ldots, f_r$"

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: $\mathbf{V}(f_i) \cup \mathbf{V}(f_i)$" should be $\mathbf{V}(f_i) \cup \mathbf{V}(f_j)$"

Page 527, line 6 of the proof of **Proposition 3**: "an affine cone" should be "the affine cone"

Page 533, line 1: "$k \to \infty$" should be "$i \to \infty$"

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

Page 537, line 3 of Exercise 16: "$W \subset$" should be "$W \subseteq$"

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"

Page 545, 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"

Page 545, line 3 of **Example 6**: "$J = \langle x^2 + y^2 - z^2, xz + y^2 - 2z^2\rangle$" should be "$J = \langle x^2 + z^2, xy + z^2\rangle$"

Page 545, lines 4 and 5 of **Example 6**: Delete the sentence "But ... homogenizing variable."

Page 545, First display of **Example 6**: Replace with "$G = \{x^2+z^2, xy+z^2, y^2z^2+z^4, xz^2-yz^2\}$"

Page 545, Second display of **Example 6**: Replace with "$G^d = \{x^2+1, xy+1, y^2+1, x-y\}$"

Page 546, line 2: "third and fourth polynomials are divisible by $\text{LT}(x+y^2-2) = x$" should be "first and second polynomials are divisible by $\text{LT}(x-y) = x$"

Page 546, line 3: "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 547, 2 lines below display (5): "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 547, line 1 of **Example 9**: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 547, lines -3 and -2: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 548, line 3 of **Proposition 10**: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 548, line 2 of the proof of **Proposition 10**: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 548, line 4 of the proof of **Proposition 10**: "row reduced echelon form" should be "reduced row echelon form"

Page 548, lines 2 and 3 after the proof of **Proposition 10**: "row reduced echelon form matrices" should be "reduced row echelon matrices"

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

Page 549, line 2 of Exercise 4: "(4)" should be "(2)"

Page 549, lines 1 and 2 of Exercise 6: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 549, line 1 of part a of Exercise 7: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 549, line 2 of part a of Exercise 8: "row reduced echelon form" should be "reduced row echelon form"

Page 550, line 3 before **Proposition 1**: "a set of polynomials" should be "a finite set of polynomials"

Page 550, line 3 of **Proposition 1**: "is Gröbner basis" should be "is a Gröbner basis"

Page 551, line −17: "studied in §2 of" should be "studied in §8 of"

Page 553, line 3 of **Example 3**: "$m \geq 0$, the set of all monomials" should be "$m \geq 2$, the set of all monomials of degree m" (two errors)

Page 555, line 2 of display (2): Add a period at the end of the line.

Page 557, lines −7 and −6: "We begin by noting the following" should be "Observe that the Hilbert-Poincaré series $P_{S/I}(t)$ can be defined for any homogeneous ideal $I \subseteq S$. This leads to the following"

Page 559, lines −21 and −20: "If there were pairs in any degrees $\leq m' - 1$ in B" should be "If there were any pairs of degree $\leq m' - 1$ in B"

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 565, Exercise 6: "Use Proposition 1." should be "For part (ii), use Proposition 1."

Page 566, line 6 of Exercise 10: "We also write" should be "With this definition, note that"

Page 566, line −2 of Exercise 10: "Chapter 5" should be "Chapter 6"

Page 566, line −17: "is strictly positive" should be "is a strictly positive integer"

Page 566, line −4: "consists of weighted" should be "consists of finitely many weighted"

Page 568, line −13: "$M := \text{ComputeM}(L, G)$" should be "$(M, \mathcal{M}) := \text{ComputeM}(L, G)$"

Page 568, line −12: "row reduced echelon form" should be "reduced row echelon form"

Page 568, line −8: "polynomial form of n" should be "polynomial form of n computed using $\mathcal{M}$"

Page 569, line −12, "a set H of polynomials" should be "a finite set H of polynomials in I".

Page 570, line 2: "matrix of coefficients M." should be "matrix of coefficients M. The procedure also returns the final value of $\mathcal{M} = \text{Mon}(H)$ since these monomials are needed to create polynomials from the rows of M."

Page 570, line 13: "a set of polynomials" should be "a finite set of polynomials"

Page 570, line 15: "i. $L \subseteq H$" should be "(i) $L \subseteq H \subseteq I$"

Page 570, line 16: "ii." should be "(ii)"

Page 570, lines 17 and 18: "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 11: "monomials in $\mathrm{Mon}(H)$" should be "monomials in $\mathcal{M} = \mathrm{Mon}(H)$"

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

Page 571, line 3 of **Proposition 1**: "of coefficients of M" should be "of coefficients of M and the monomials $\mathcal{M} = \mathrm{Mon}(H)$ appearing in H"

Page 571, line −19: "Output : M" should be "Output : $(M, \mathcal{M})$"

Page 571, between line −9 and −8: Insert a new line "$\mathcal{M} := \mathrm{Mon}(H)$"

Page 571, line −8: "RETURN M" should be "RETURN $(M, \mathcal{M})$"

Page 573, line 8: "the difference" should be "their difference"

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

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

Page 573, line 10 of **Example 3**: "$\mathrm{Mon}(H) =$" should be "$\mathcal{M} = \mathrm{Mon}(H) =$"

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

Page 573, line −4: "row reduced echelon form matrix" should be "reduced row echelon matrix"

Page 574, line 9: "$\mathrm{Mon}(H) =$" should be "$\mathcal{M} = \mathrm{Mon}(H) =$"

Page 574, line −16: "$\mathrm{Mon}(H) =$" should be "$\mathcal{M} = \mathrm{Mon}(H) =$"

Page 574, line −15: "row reduced echelon matrix" should be "reduced row echelon matrix"

Page 575, line 13: "row-reduced echelon form" should be "reduced row echelon form"

Page 575, line 4 of part a of Exercise 2: "row reduced echelon form" should be "reduced row echelon form"

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

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

Page 576, lines 10 and 11: "row reduced echelon form" should be "reduced row echelon form"

Page 577, line 5: "Eder and Faugère (2014)" should be "Eder and Faugère (2017)"

Page 578, line −13: "sum of vectors with just one nonzero" should be "sum of vectors, each with just one nonzero"

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 4: "leading term" should be "largest term"

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 582, line 3: "$\mathfrak{s}(g) \geq_{POT} \mathfrak{s}(x^\alpha h)$" should be "$\mathfrak{s}(g) >_{POT} \mathfrak{s}(cx^\alpha h)$ or $\mathfrak{s}(g) = \mathfrak{s}(cx^\alpha h)$"

Page 582, line 5: "is a **regular $\mathfrak{s}$-reduction**." should be "is a **regular $\mathfrak{s}$-reduction**. Thus an $\mathfrak{s}$-reduction is regular when $\mathfrak{s}(g) >_{POT} \mathfrak{s}(cx^\alpha h)$ or when $\mathfrak{s}(g)$ and $\mathfrak{s}(cx^\alpha h)$ differ only in their k-coefficients."

Page 583, line −11: "same leading term" should be "same signature"

Page 583, line −8: "between leading" should be "between largest"

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" (change period to comma)

Page 585, proof of **Proposition 15**: Delete the existing proof and replace it with the following:

Proof. Aiming for a contradiction, suppose that $\phi(\mathbf{g}) \neq \phi(\mathbf{h})$, so that $\mathbf{g} - \mathbf{h}$ is not a syzygy. But $\mathfrak{s}(\mathbf{g}) = \mathfrak{s}(\mathbf{h})$ implies that $\mathfrak{s}(\mathbf{g} - \mathbf{h})$ is smaller in the $>_{POT}$ order, which by assumption implies that under $\mathbf{G}$, $\mathbf{g} - \mathbf{h}$ $\mathfrak{s}$-reduces to zero, i.e., $\mathfrak{s}$-reduces to a syzygy.

It follows that $\mathbf{g} - \mathbf{h}$ has at least one $\mathfrak{s}$-reduction under $\mathbf{G}$. Thus there is a term bx^β of $\phi(\mathbf{g} - \mathbf{h})$ and $\mathbf{g}_i \in \mathbf{G}$ such that

$$\text{LT}(cx^\alpha \phi(\mathbf{g}_i)) = bx^\beta$$

with $\mathfrak{s}(cx^\alpha \mathbf{g}_i) <_{POT} \mathfrak{s}(\mathbf{g} - \mathbf{h})$ or $\mathfrak{s}(cx^\alpha \mathbf{g}_i) = \mathfrak{s}(\mathbf{g} - \mathbf{h})$. Interchanging of $\mathbf{g}$ and $\mathbf{h}$ if necessary, we can assume that $\phi(\mathbf{g})$ has a term $b'x^\beta$. Setting $c' = cb'/b$ gives $\text{LT}(c'x^\alpha \phi(\mathbf{g}_i)) = b'x^\beta$. Since $\mathfrak{s}(\mathbf{g} - \mathbf{h}) <_{POT} \mathfrak{s}(\mathbf{g})$, it follows immediately that we have a regular $\mathfrak{s}$-reduction of $\mathbf{g}$ by $\mathbf{g}_i$, which contradicts our assumption that $\mathbf{g}$ was regular $\mathfrak{s}$-reduced. □

Page 585, line −4: "Eder and Faugère (2014)" should be "Eder and Faugère (2017)"

Page 587, second paragraph: Replace the third sentence and fourth sentences "The algorithm applies ... one of those signatures" with the sentences below:

We will follow the discussion from section 7.1 of Eder and Faugère (2017). 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 (2017). 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, line 2 of third paragraph: "Eder and Faugère (2014)" should be "Eder and Faugère (2017)"

Page 587, third line of second display: "$\mathbf{e_2}$" should be "$\mathbf{e}_2$" (subscript "2" should not be bold)

Page 587, line −5: "them it into" should be "them into"

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 588, 2 lines above display (8): "the leading" should be "the largest"

Page 588, immediately following display (10): Add the following new sentence (with no indent):

"This pass also adds $\mathbf{e}_3$ to $\mathbf{G}$, which accounts for the presence of $f_3 = z^3 - t^3$ in the final Gröbner basis."

Page 589, line 3 of third bullet: "Eder and Faugère (2014)" should be "Eder and Faugère (2017)"

Page 589, line 4 of fourth bullet: "Corollary 7.16 of Eder and Faugère (2014)" should be "Corollary 7.2 of Eder and Faugère (2017)"

Page 591, **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 614, lines 8 and 9: "(this computes ... in u, v)" should be "[this computes ... in u, v]"

Page 625, line 3 of item 13: "algebraic varieties" should be "varieties"

Page 627, reference "D. Anderson, R. Goldman, T. Sederberg (1984a)", second line: "*curves and surfaces*" should be "curves and surfaces"

Page 629, reference "C. Eder, J. Faugère": Replace this reference with the following:

C. Eder, J. Faugère, A survey on signature-based algorithms for computing Gröbner bases, J. Symb. Comput. **80**, 719–784 (2017).

Page 632, reference "D. Mumford": "cCorrrected" should be "Corrected"

Page 641, right column, line 5 of index entry "matrix": "row reduced echelon" should be "reduced row echelon"

Page 643, right column, between index entries for "reduced Gröbner basis" and "regular sequence": Add a new index entry "reduced row echelon matrix, *see* echelon matrix"

Page 644, left column: Delete index entry "row reduced echelon matrix, *see* echelon matrix"