Karin Erdmann and Mark J. Wildon
Introduction to Lie Algebras

List of corrections

Chapter 1 no corrections

Chapter 2

page 15 Exercise 2.7(i) Change $\{(x_2, 0) : x_2 \in L_1\}$ to $\{(0, x_2) : x_2 \in L_2\}$.

Chapter 3

page 19 corrected bad breaks in line 3 and in 'Exercise 2.8'.
page 20 After Theorem 3.1, moved the quotation before 'the'
page 22 In proof of Theorem 3.2, replaced $[x, w]$ with $[x, z]$ and $[y, w]$ with $[y, z]$, and changed a to α, and b to β.
page 23 Corrected bad break in 'Exercise 3.2' on page 23.
page 25 Top line, capitalised 'step'.
2nd line, changed $\lambda \in L$ to $\lambda \in \mathbf{C}$.
4th line, changed 'If we replace ..' to 'If in Step 3 we replace'
Deleted 'over a field F' from Exercise 3.1

Chapter 4

page 30 line 1, replaced 'previous exercise' with Exercise 4.1
line 3, deleted comma following 'If L/I'
in Defn 4.6, Add 'finite-dimensional' after non-zero
page 31 End of proof of Lemma 4.7: deleted brackets in $\mathrm{rad}(L)$
page 32 In Remark 4.10 replaced 'any' with 'an'
page 33 In Exercise 4.2, replaced 'Show that A' with 'Show that x'

Chapter 5

page 40 Corrected bad break in Lemma 5.4 in 'Exercise 5.3'.
page 41 In proof of Lemma 5.5, changed 'For column r' to 'More generally, for column r+1' and removed paragraph break.
bottom of page, changed 'column r' to 'column r+1'.
page 44 At end of Exercise 5.7, xy^{m-k} replaced by $y^{m-k}x$.

Chapter 6

page 46 Exercise 6.1 (ii) Change V/W to V/U in second line.
Exercise 6.1 (ii) add commas in $\{v_1 + U, \ldots, v_{n-1} + U\}$
page 48, penultimate, change X to L
page 49, top line change $\tilde{L}$ to $\bar{L}$
Remark 6.4, first line: delete first 'of'

page 50, Exercise 6.2 (ii) add commas in $\{v_1 + U, \ldots, v_{n-1} + U\}$
last paragraph: corrected bad break in 'Lemma 5.5'
page 51 displayed equation: change $\lambda(x)$ to $\lambda(a)$
penultimate line, change 'previous' to 'following'

Chapter 7

page 57 Example 7.6: change 'solvable Lie algebra' to 'complex solvable Lie algebra'
Below Example 7.6, change W/V to V/W.
page 58 Example 7.8: change A to X (twice)
page 60 Definition of module homomorphism: change to $\theta(x \cdot v) = x \cdot \theta(v)$ for all $v \in V$ and $x \in L$.
Theorem 7.11 last line: replace V/I with V/W.
page 61 Example 7.12 line 5: add ', such that' after 'equivalently'.
page 62 Lemma 7.13: change 1_V to 1_S a few times.
page 63 Exercise 7.6(iii) insert 'non-zero' into 'every submodule'.
page 65 Exercise 7.12: part (iii) should be labelled part (ii).

Chapter 8

page 69 bottom: Delete full stop following $\phi(h)$ matrix
page 74 After Theorem 8.7: change 'Appendix C' to 'Appendix B'
page 75 Exercise 8.4: change W_r to $\{v \in V : h \cdot v = rv\}$.
Exercise 8.6: replace L in first line by $\mathsf{sl}(2, \mathbf{C})$.
Exercise 8.6: displayed equation should end 'for $v \in M$'.

Chapter 9
page 82 2nd parargraph: change $\dim W \cap \dim W^\perp$ to $W \cap W^\perp$.
Proof of Thm 9.9 A in wrong font three times.
page 84 first displayed equation: change $, L_r$ to $\oplus L_r$.
line 3: change $I \cap L_i$ to $I \cap I^\perp$
page 85 proof of Prop 9.13, 3rd paragraph: delete sentence starting 'We have ...' and replace with 'If M is properly contained in $\mathrm{Der}(L)$ then $M^\perp \neq 0$, so it is sufficient to prove that $M^\perp = 0$.'
Above 9.6: change 'direct sum of semisimple ...' to 'direct sum of simple'.
page 88 second paragraph: corrected bad break in 'Exercise 9.16'.

Chapter 10

page 93 line 3: change $\alpha : H \to L$ to $\alpha : H \to \mathbf{C}$.
before display (*): change $L^\star$ to $H^\star$
page 94 line -5 from end: change H to $\mathsf{sl}(3, \mathbf{C})$.
page 98 3rd paragraph, change $-\alpha(h)x$ to $-\alpha(h)y$
Exercise 10.3(ii), replace S_α with $\mathsf{sl}(\alpha)$.
page 99 corrected bad break in Exercise 9.10.
page 101 3rd paragraph of the proof, reworded.
Last paragraph before Proposition 10.10: add hyphen to h_α-eigenvector
Proposition 10.10: 'if $k \in \mathbf{Z}$, then' after 'such that' and remove the next 'if $k \in \mathbf{Z}$.

page 105 matrix transposed.
page 106 Exercise 10.5. Change $2|\Phi|$ to $|\Phi|$.
Exercise 10.7(i) replace 'span H' with 'span $H^\star$'.

Chapter 11

page 110 Definition 11.1: change 'real vector space' to 'real inner-product space'.
page 111 Exercise 11.1 line 2: change E to $\mathbf{R}^{\ell+1}$
page 113 Diagram in Example 11.6(a). The root $-\beta$ was wrongly labelled β. Example 11.6(b) 'root system', not 'root space'.
page 117 top line. 'elements of B', not 'elements of α'.
page 118 Lemma 11.13. Corrected the very bad break.

Chapter 12

page 126 2nd displayed eqn: insert $\alpha \neq 0$ before $L_\alpha \neq 0$
Lemma 12.2: insert 'non-zero' before $h \in H$.
page 127 Proposition 12.3. Add 'non-zero' before $\alpha \in H^\star$ and insert '(So we assume that $H = L_0$.)' before 'Suppose that ...'.
page 131 (2c). Change $h_{ij} =$ to $k_{ij} :=$ and h_{ij} to k_{ij} in last line.
page 135 (1) definitions of p_{ii} and q_{ii} given separately.
(2) corrected accordingly.

Chapter 13

page 145 line 2 of proof of 13.8: Corrected k to $k-1$
page 146 line 1 of proof of 13.10: Corrected p to $p-1$
page 147 diagram, corrected y_q to w_q and y_1 to w_1
page 148 last line of proof, corrected r to p.

Chapter 14
No corrections

Chapter 15

page 164 line 7 of 15.1: Corrected Φ to Π.
Corrected spacing of L just before section 15.1.1
page 166 changed α_i to α_{i_1} etc.
in 2nd display: change $[f_{\alpha_1}, e_\alpha]$ to $[e_\alpha, f_{\alpha_{i_1}}]$
Change line below to 'Now $[e_\alpha, f_{\alpha_{i_1}}] \in [L_\alpha, L_{-\alpha_{i_1}}] \subseteq L_{\alpha-\alpha_1}$.
page 168 in 15.1.2, the displayed $v \wedge w$ Corrected w_j to v_j
page 170 in 15.1.3 line 3 $v_i \otimes w_j$
page 172 make consistent: order f, h, e.
page 176 line -12: module (not modules).
page 178 line before exercise 15.4 Corrected K to F twice.
page 183 second paragraph of 15.6 characteristic p (not 0).
page 184 the quiver, remove the large 3.

page 187 Exercise 15.8(ii) insert 'and $U(L)$ with V in the commutative diagram above' before 'then V has'.

Appendix A
page 191 in 16.1(a) Corrected W to im$x$
page 196 middle: Corrected 'a suitable $f(X)$' to 'a suitable $p(X)$
2nd display: change $a(X)$ to $a(x)$
page 198 diagram, swap the horizontal and vertical axes labels.
page 202 defn 16.9, last line made it 'for all $v, w, v_i, w_i \in V$
page 205 moved 'end of proof' symbol up (now after 'as required').
three lines below: added 'result' (after 'analogous')

Appendix B and C no corrections.

Appendix D
page 224 line 9 corrected B to B'
line -6 added $\square$

Appendix E

page 233 Solution 2.11: need to swap P and P^{-1} everywhere except in the first displayed equation.
page 234 Solution 3.2 end of first paragraph: insert comma in $[y_1, z_1]$.
page 236 Solution 6.5 first line: change ad$L$ to L.
page 238 Solution 8.6 second display, second line: change he to eh.
page 241 Solution 10.6 first display: change end to $-1 * -1 = 1$.

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