Corrections to the book
"Linear Time-Varying Systems - Algebraic Analytic Approach"
by H. Bourlès and B. Marinescu

1. p. v, line 2 from top: read "a été" instead of "à été"
2. p. viii, line 7 from top: read [225] instead of [224]
3. p. 5,
   - 7th line from top, after $X_i' \cap X_j'$, add "= \emptyset"
   - 3rd line after Definition 3: change $\prod$ to $\bigcup$
   - 1st line of §1.2.1.5, after "$\mathcal{R} (x, x')$", add "or $x \mathcal{R} x'$"
4. p. 6, 9th line of §1.2.2.1, change $\text{Hom}_C (X, X)$ to $\text{Hom}_C (X, Y)$
5. p. 9, before §1.2.2.4: delete the sentence in parentheses
6. p. 10, lines 12 and 16 from top: read "generator" instead of "cogenerator"
7. p. 11, line 6 from top: read "if" instead of "is"
8. p. 14,
   - 1st line from top: change "$\mathcal{C} \to \mathcal{C}$" to "$I \to \mathcal{C}$, where $I$ stands for the category consisting of the object $I$ alone"
   - 4th line from bottom: change "complete" to "cocomplete"
   - 2nd line from bottom: change $x_i \mathcal{R} x_j$ to $x_i \equiv x_j \pmod{\mathcal{R}}$
9. p. 15, last line, after "functor", add "$I \to \mathcal{C}$"
10. p. 16, 2nd line after the proof of Proposition 23: change "cocomplete" to "complete"
11. p. 26, last line of Lemma and Definition 53, add: "See Lemma 571 below."
12. p. 27, 3rd line of Sect. 1.3: suppress a blank and a dot
13. p. 41, 4th line of Example 109: change "be" to "is"
14. p. 47, Remark 132(a,ii), 2nd line: change $M$ to $\mathbf{M}$ three times
15. p. 51,
   - 2nd line of Item (3) of Theorem and Definition 145: change "then $f$" to "then $\bar{f}$"
• 2nd line from bottom: change \( g \) to \( x \) two times

16. p. 55, 2nd line from top: after "if", add "\( s = r \) and"

17. p. 57, line 6 from top: after "by", add "\( f \) with respect to"

18. p. 58, 6th line of (1.6.9.1): change \( \bigcup \) to \( \bigcup \)

19. p. 60, 3rd line from top, after "limits", add "and continuity"

20. p. 62, line 12 from below,
   • add at the beginning of the line "and the converse holds true if \( X \) is semicomplete"
   • change \( \S \) III.5,” to ”\( \S \) III.4, Corol. 1 and”

21. p. 65,
   • \( \S \)1.7.3.4, title: change "Inductive" to Projective Limits and Inductive"
   • Just below, add the following:
     Let \( I \) be a filtering set and let \( \{ X_i \left[ T_i \right], \psi_{ij} \} \) be an inverse system with index set \( I \) in the category \( LCS \) (Definition 21). The projective limit \( \lim_{\leftarrow} X_i \left[ T_i \right] \) is defined as usual (Definition 22) and is an LCS \( X \left[ T_{\leftarrow} \right] \). This LCS is complete (resp., semicomplete) if, and only if so is each \( X_i \left[ T_i \right] \). Furthermore, every complete LCS is a projective limit of Banach spaces ([190], 19.9(1), 19.10(2)).

22. p. 66, 4rd line from below, add the following sentence at the beginning of the line: "Clearly, as defined above, an \((FS)\) space is a projective limit of Banach spaces with compact maps \( \psi_{ij} = \rho_{ij} \), and dually a \((DFS)\) space is an inductive limit of Banach spaces with compact maps \( \varphi_{ij} = \rho_{ij} \)."

23. p. 67,
   • line 16 from bottom: instead of "a ", read "for it is a Schwartz space ([147], \S III.4), thus an \((FS)\) space"
   • line 14 from bottom, at the end of the sentence, add "since from the above it is a \((DFS)\) space"

24. p. 68, 2nd line from bottom, after "space.", add: "Furthermore, it can be proved to be an \((FS)\) space ([149], Chap. 4, Part 4, Corol. 2 of Prop. 5)."

25. p. 69, suppress lines 9 and 10 from top

26. p. 71,
• 4th line from top: change $\varphi$ to $\varphi_n$
• 7th line from top: after change "a" to "an ($\mathcal{FS}$) space, thus a"
• 9th line from top: after "is", add "a ($\mathcal{DFS}$) space, thus is"
• Replace the sentence beginning at line 14 by "Therefore" by the following:
  "The LCS $\mathcal{D}(X)$ [$\mathfrak{T}_\infty$] and its strong dual $\mathcal{D}'(X)$ have the same topological properties as $\mathcal{E}(X)$ [$\mathfrak{T}_\infty$] and $\mathcal{E}'(X)$, i.e. they are an ($\mathcal{FS}$) space and a ($\mathcal{DFS}$) space, respectively."
• p. 72, 8th line from top: put "22.18.7" in parentheses
• 3rd line from bottom: add a right parenthesis after "(14.1.1)"

27. p. 82, 2nd line: change $\mathcal{B}(X)$ to $\mathcal{B}(X)$
28. p. 83, 4th line of Exercise 196: change "categories but are" to "but"
29. p. 84, in Exercise 199(2), first line: after "be", add "a"
30. p. 85, 2nd line from bottom: change $S$ to $X$

31. p. 86,
• 5th line from top, before the first "if", add: "(i.e., for every neighborhood $V$ of $y$ in $S_2$, there exists a neighborhood $U$ of $x$ in $S_1$ such that $f(t) \in V$ whenever $t \in U$)"
• 7th line from top, before "and", add: "(i.e., $\lim_{t \to a} f(t) = f(a)$)"

32. p. 87, in Exercise 213
• Item (v), 3rd line: suppress "general"
• Item (viii, b), 3rd line: suppress "a"

33. p. 88, 3rd line from bottom: add a hyphen between "group" and "homomorphism"

34. p. 92, 5th line from bottom: suppress once "$GCD, EDR$"
35. p. 93,
• in Remark 220(b), 1st line, change "properties (ii)" to "property (i) of Definition 218"
• in Definition 221, at the end of the second line, add "where $n \mathbb{1} \triangleq 1 + \ldots + 1$ ($n$ times)"

36. p. 107, 9th line from top: change "$j$th" to "$i$th"
37. p. 110, 6th line from bottom, change the expression $\beta_i = \sum_{1 \leq i \leq n} p_{ij} \alpha_i$
\[ \beta_i = \sum_{1 \leq j \leq n} p_{ij} \alpha_j \]

38. p. 129, 6th line from bottom: delete 340
39. p. 137, 4th line from bottom: after "\( \partial_k \)" , add "is"
40. p. 138,
   • 9th line from top: change "makes sense" to "holds"
   • 11th line from top: change \( S \) to \( S' \) and \( S' \) to \( S' \)
41. p. 139, 1st line of the proof of Theorem 362, before "(i):", add "We proceed by contradiction."
42. p. 141,
   • 2nd line from top, delete "(i)"
   • 4th line from top, change "quotient division ring" to "division ring of fractions"
43. p. 142, 13th line from top, after the parenthesis, add "for \( i = 0 \)"
44. p. 144, 4th line from bottom, change \( P \) to \( P_N \)
45. p. 146, 2nd line from top: multiply the right-hand member of the equality by \((-1)^N\)
46. p. 149, end of the proof of Theorem 383: close the parenthesis
47. p. 152, 9th line from top: change "Jacobson ideal" to "Jacobson radical".
48. p. 153, 3rd line from top: read "V.1" instead of "VI.1"
49. p. 181,
   • 2nd line from bottom: change "and \( V \)" to ". (i) Let \( V \) be"
   • 1st line from bottom: add the following to the last sentence:
     (ii) Let \( \mathcal{U} : K \to K \) be a homomorphism. Prove that \( \mathcal{U} \) is injective.
     (Hint: use Theorem 227 and Lemma 232.)
50. p. 185, 7th line from top: change \( X - \lambda \) to \( t - \lambda \)
51. p. 204,
   • 6th line, change \( xa - by = 1 \) to \( ax - yb = 1 \)
   • 5th line of Corollary 529: change \((a, b)\) to \((b, a)\) and "right-" to "left-"
   • 3rd line from bottom: change \((a, b)\) to \((b, a)\)
   • 2nd line from bottom: change \( ab = b'a' \) to \( ba = a'b' \), and \((a', b)\)
     to \((b, a')\), and "right-" to "left-"
• 1st line from bottom: change "(a', b) is strongly right-" to "(b, a') is strongly left-"

52. p. 205, 1st line from top: change \( ab = b'a' \) to \( ba = a'b' \)

53. p. 272, lines 6 and 7 of the proof of Theorem 707:
- delete "we have ... Therefore,"
- after "is injective", add "(Exercise 472(ii))"

54. p. 274, lines 6, 13 and 21 from top: change "monomorphism" to "homomorphism"

55. p. 287, 3rd and 8th line of Theorem 752, change
- \( X^n + p_1 X^{n-1} + \ldots + p_n \) to \( X^n - p_1 X^{n-1} + \ldots + (-1)^n p_n \)
- \( X^n + p_1 A^{n-1} + \ldots + p_n I_n \) to \( X^n - p_1 A^{n-1} + \ldots + (-1)^n p_n I_n \)

56. p. 298,
- 1st line of the proof of Lemma 777: change "(i) and" to "(i) is proved in ([28], §V.16, Theorem 1)."
- delete the last sentence of the 1st § of the proof
- at the beginning of the 2nd §, suppress "(1)"
- delete lines 12 to 15
- delete §(2) of the proof

57. p. 315, 4th line of Prop. 810, in the brackets: change \( S \) to \( S_k \)

58. p. 346, 9th line of Theorem and Definition 863, after "observable image representation", add " , i.e. there exists an \( E \)-linear bijection \( (S\bullet) : \ber W \tilde{\rightarrow} \mathcal{B}_W (M) \) induced by the \( E \)-linear injection \( (S\bullet) : \ber W \rightarrow kW \)"

59. p. 360,
- Instead of the 4 last lines of Proposition 881, read the following:
  "The following conditions are equivalent:
  (i) \( \tilde{M} \) is strongly controllable;
  (ii) \( \tilde{M} \) is controllable;
  (iii) \( \tilde{M} \) is Kalman-controllable;
  (iv) there exists an integer \( s \geq 1 \) such that \( rk_k \Gamma_s (t_0) = n; \)
  (v) there exists a discrete subset \( S \) of \( \Omega \) such that \( rk_k \Gamma_n (t) = n \) for all \( t \in \Omega \setminus S. \)"
In the proof of Proposition 881,
(a) 3rd line from top, instead of "(i)(a)", read "(ii) ⇒ (iii) by Theorem and Definition 879(3).
   (iii) ⇒ (iv)
(b) 5th line from bottom, instead of "(b)", read "(iv) ⇒ (iii):" 
(c) Last line, instead of "For (ii)", read "(iii) ⇔ (v):"
(d) At the end of the proof, the following is added: "(v) ⇒ (i): (iv) holds
   if, and only if there exists a submatrix $\Delta_n(t)$ of $\Gamma_n(t)$, consisting
   of $n$ columns of $\Gamma_n(t)$, such that $|\Delta_n(t)| \neq 0$ for all $t \in \Omega \setminus S$. This means that the analytic function $t \mapsto |\Delta_n(t)|$
   is nonzero, i.e. $rk_K \Delta_n = rk_K \Gamma_n \neq 0$. Therefore, (i) holds by
   Theorem and Definition 879(2)."

60. p. 390, in Exercise 939, after the end of the 2nd sentence, add: "(Hint: use
   Theorem and Definition 185(ii).)"

61. p. 396, in Part (ii) of Exercise 956, read "$\Omega$" instead of "$\Omega \setminus S$"

62. p. 390, in Exercise 935, add after the last line: "(Hint: show that $\bar{P} \rightarrow P \delta_x$,
   where $\bar{P} = P + m$, is an isomorphism.)"

63. p. 400,
   ● 10th line from bottom: at the end of the sentence, the following is added:
       "and Ilchmann et al. [163]"
   ● 9th line from bottom: this sentence is deleted

64. p. 415, Definition 982, replace $\chi(f) = a$ by $\chi[f] = a$

65. p. 416, Theorem 425: in the last line, read "not exponentially stable" instead
   of "exponentially unstable"

66. p. 420, Definition 990: To be coherent with the definition in the literature (see,
   e.g., [286]), $\partial$ should be replaced by $\delta = t\partial$

67. p. 452: line 8 from bottom: read $\{-a\}$ instead of $\{a\}$

68. p. 425, lines 14 and 16 from top: replace $\bar{K}$ and $\tilde{K}$ by $\overline{K}$

69. p. 426, line 1 from top: replace $a_n$ by $a_m$

70. p. 443, Section 6.7.1:
   ● after the first sentence add: Laurent polynomials in the indeterminate $q$
       must be used for Theorem 367 to apply (simplicity of the ring $T$)
   ● delete the last sentence of the first paragraph
71. p. 630, 25th line from top: delete the entry "stably free"