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 "$= \varnothing$"
   - 3rd line after Definition 3: change $\coprod$ to $\dot{\bigcup}$
   - 1st line of §1.2.1.5, after "$\mathcal{R}\left(x, x'\right)$", add "or $x \mathcal{R} x'$"
4. p. 6, 9th line of §1.2.2.1, change $\mathrm{Hom}_{\mathcal{C}}\left(X, X\right)$ to $\mathrm{Hom}_{\mathcal{C}}\left(X, Y\right)$
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 "$\mathcal{C} \longrightarrow \mathcal{C}$" to "$I \longrightarrow \mathcal{C}$, 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 $x_i \equiv x_j \left(\mathrm{mod}\, \mathcal{R}\right)$
9. p. 15, 1ast line, after "functor", add "$I \longrightarrow \mathcal{C}$"
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 $\overset{\bullet}{\bigcup}$
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 $X\left[\mathfrak{T}\right]$ is semicomplete"
    - change "§III.5," to "§III.4, Corol. 1 and"
21. p. 65,
    - §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 $\left\{X_i\left[\mathfrak{T}_i\right], \psi_j^i\right\}$ be an inverse system with index set I in the category **LCS** (Definition 21). The projective limit $\varprojlim X_i\left[\mathfrak{T}_i\right]$ is defined as usual (Definition 22) and is an LCS $X\left[\mathfrak{T}_{\varprojlim}\right]$. This LCS is complete (resp., semicomplete) if, and only if so is each $X_i\left[\mathfrak{T}_i\right]$. 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 $\left(\mathcal{FS}\right)$ space is a projective limit of Banach spaces with compact maps $\psi_j^i = \rho_j^i$, and dually a $\left(\mathcal{DFS}\right)$ space is an inductive limit of Banach spaces with compact maps $\varphi_j^i = \rho_j^i$."
23. p. 67,
    - line 16 from bottom: instead of "a ", read "for it is a Schwartz space ([147], §III.4), thus an $\left(\mathcal{FS}\right)$ space"
    - line 14 from bottom, at the end of the sentence, add "since from the above it is a $\left(\mathcal{DFS}\right)$ space"
24. p. 68, 2nd line from bottom, after "space.", add: "Furthermore, it can be proved to be an $\left(\mathcal{FS}\right)$ 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 φ to φ_n
- 7th line from top: after change "a" to "an $\left(\mathcal{FS}\right)$ space, thus a"
- 9th line from top: after "is", add "a $\left(\mathcal{DFS}\right)$ space, thus is"
- Replace the sentence beginning at line 14 by "Therefore" by the following: "The LCS $\mathcal{D}\left(X\right)\left[\mathfrak{T}_{\rightarrow}^{\infty}\right]$ and its strong dual $\mathcal{D}_{\beta}'\left(X\right)$ have the same topological properties as $\mathcal{E}\left(X\right)\left[\mathfrak{T}_{\rightarrow}^{\infty}\right]$ and $\mathcal{E}_{\beta}'\left(X\right)$, i.e. they are an $\left(\mathcal{FS}\right)$ space and a $\left(\mathcal{DFS}\right)$ 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 $B\left(X\right)$ to $\mathcal{B}\left(X\right)$
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 $f\left(t\right) \in V$ whenever $t \in U$)"
    - 7th line from top, before "and", add: "(i.e., $\lim\limits_{t \rightarrow a} f\left(t\right) = f\left(a\right)$)"
32. p. 87, in Exercise 213
    - Item (v), 3rd line: suppress "general"
    - Item (viii, b), 3rd line: supress "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 $n1 \triangleq 1 + ... + 1$ (n times)"
36. p. 107, 9th line from top: change "jth" to "ith"
37. p. 110, 6th line from bottom, change the expression $\beta_i = \sum_{1 \leq i \leq n} p_{ij}\, \alpha_i$

to $\beta_i = \sum_{1 \leq j \leq n} p_{ij}\, \alpha_j$

38. p. 129, 6th line from bottom: delete 340
39. p. 137, 4th line from bottom: after "∂_k", add "is"
40. p. 138,
    - 9th line from top: change "makes sense" to "holds"
    - 11th line from top: change $\mathcal{S}$ to $\mathfrak{S}$ and $\mathcal{S}'$ to $\mathfrak{S}'$
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 $u : \mathbf{K} \to \mathbf{K}$ be a homomorphism. Prove that 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 "$\left(a',b\right)$ is strongly right-" to "$\left(b,a'\right)$ 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
    - $X^n+p_1X^{n-1}+...+p_n$ to $X^n-p_1X^{n-1}+...+\left(-1\right)^n p_n$
    - $X^n+p_1A^{n-1}+...+p_nI_n$ to $X^n-p_1A^{n-1}+...+\left(-1\right)^n p_nI_n$
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 $\mathcal{S}$ to $\mathcal{S}_k$
58. p. 346, 9th line of Theorem and Definition 863, after afer "observable image represetention", add " , i.e. there exists an $\mathbf{E}$-linear bijection $\overline{\left(S\bullet\right)}:{}^rW\tilde{\rightarrow}\mathfrak{B}_W\left(M\right)$ induced by the $\mathbf{E}$-linear injection $\left(S\bullet\right):{}^rW\hookrightarrow{}^kW$ "
59. p. 360,
    - Instead of the 4 last lines of Proposition 881, read the following:
      "The following conditions are equivalent:
      (i) M is strongly controllable;
      (ii) M is controllable;
      (iii) M is Kalman-controllable;
      (iv) there exists an integer $s\geq 1$ such that $\mathrm{rk}_{\mathbf{k}}\,\Gamma_s\left(t_0\right)=n$;
      (v) there exists a discrete subset S of Ω such that $\mathrm{rk}_{\mathbf{k}}\,\Gamma_n\left(t\right)=n$ for all $t\in\Omega\backslash S$."

- In the proof of Proposition 881,
  (a) 3rd line from top, instead of "(i)(a)", read "(ii)$\Rightarrow$(iii) by Theorem and Definition 879(3).
  (iii)$\Rightarrow$(iv):"
  (b) 5th line from bottom, instead of "(b)", read "(iv)$\Rightarrow$(iii):"
  (c) Last line, instead of "For (ii)", read "(iii)$\Leftrightarrow$(v):"
  (d) At the end of the proof, the following is added: "(v)$\Rightarrow$(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 $t \in \Omega \backslash S$. This means that the analytic function $t \mapsto |\Delta_n(t)|$ is nonzero, i.e. $\mathrm{rk}_{\mathbf{K}} \Delta_n = \mathrm{rk}_{\mathbf{K}} \Gamma_n \neq 0$. 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 Therorem and Definition 185(ii).)"
61. p. 396, in Part (ii) of Exercise 956, read "Ω" instead of "$\Omega \backslash S$"
62. p. 390, in Exercise 935, add after the last line: "(Hint: show that $\bar{P} \longrightarrow P\delta_x$, where $\bar{P} = P + \mathfrak{m}$, 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. 420, Definition 990: To be coherent with the definition in the literature (see, e.g., [286]), ∂ 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 $\check{\mathbf{K}}$ and $\breve{\mathbf{K}}$ by $\widetilde{\mathbf{K}}$
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 $\mathbf{T}$)
    - delete the last sentence of the first paragraph

71. p. 630, 25th line from top: delete the entry "stably free"