Errata

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No serious errors have been found, but see at least section "A. Dangerous errors" below, probably also Section B.

Notation

Here "s.b." means "should be"
... denotes a (TeX) math formula
$\mathbb{A},\mathbb{B},\mathbb{C},\ldots$ is blackboard bold $A,B,C,\ldots$.
"l. -3" means the 3rd line from the bottom; "p. 59" means "page 59"; "L2.2.2 means Lemma 2.2.2".

1 A. DANGEROUS ERRORS:

(the reader might apply an incorrect result)

!!p. 57, L2.2.2(c2): Add the assumption that $\mathbb{E} = \mathbb{E}^*$. (This was missing in [IZ01] and corrected later. Ilya Spitkovsky presented a counter-example and also showed that the corrected result cannot be generalized to MTI_d (atomic measures).)

p. 287, l. -1: add "$^{-1}$" to the left and replace the lower $\mathbb{M}\tilde{\mathbb{X}}$ by $\mathbb{X}\tilde{\mathbb{M}}$.

pp. 325–326: L7.3.6(b2): add the assumption that $\mathbb{D}$ is DPF-stabilizable (we do not know if this assumption is redundant).

p. 443, Lemma 9.4.3(a1). The statement and proof contain too few details. See Theorem 3.10.11 of [Sbook] for the exact statement and further details. (9.43): $1 \geq \alpha > \beta > \gamma \geq 0$.

p. 453, l. 11: $r <$ s.b. $-r <$. l. -9: delete $+2\gamma$.

p. 507: Proposition 9.10.2(b3): delete the last row. (Thus, 2° of the proof belongs to (b4), where (b1) must be used to justify "by the assumption".)

p. 539, Lemma 9.14.2(c): "S in one-to-one" s.b. "$\mathbb{D}$ is J-coercive". (However, "Σ is stable" may be removed if one modifies the proof.)

p. 551, l. -1: "«" s.b. "$\leq$".

p. 801, l. -13: In (the discrete-time form of) Lemma 4.1.8(e) we may have $\hat{\mathbb{D}}(0)u_0 = 0$.

2 B. FAIRLY SAFE ERRORS:

(E.g., typos that are rather obvious but appear in results/statements.)

p. 29: "A-BK" should be "A+BK"

p. 76, Th2.6.4(a1): "$= \mathcal{A}$" s.b. "$\subset \mathcal{A}$" and "$= \tilde{\mathcal{A}}$" s.b. "$\subset \tilde{\mathcal{A}}$". Similarly in its proof on p. 77.

p. 158, l. -4: "L^2" s.b. "L^2_ω".

p. 170, l. 8: "weak, strong and uniform" s.b. "weak and strong".

p. 231, formula (6.142): "BLC_L" s.b. "$BL(I-DL)^{-1}C_s$" (restricted to H_B, whereas $\mathrm{Dom}(C_L) = \mathrm{Dom}(A_L) \subset H_B$ might be too small for (6.142)).

p. 304, Rem7.2.8: remove "$\hat{\mathbb{Q}}$,". On the same line, "C" s.b. "Ω". Three lines lower: "Thus" s.b. "Moreover".

p. 311, Th7.2.14(ii)&(ii'): TIC(U) s.b. TIC(Y,U) (ii'): rhs s.b. $(\tilde{\mathbb{S}}+\mathbb{U}\tilde{\mathbb{N}})^{-1}(\tilde{\mathbb{T}}+\mathbb{U}\tilde{\mathbb{M}})$

p. 312 l. 3: $\mathbb{U} \in TIC$ s.b. $\mathbb{U} \in TIC(Y,U)$. (7.51): rhs s.b. $(\tilde{\mathbb{S}}+\mathbb{U}\tilde{\mathbb{N}})^{-1}(\tilde{\mathbb{T}}+\mathbb{U}\tilde{\mathbb{M}})$

p. 370, l. 1-2: Should be "$\mathbb{K}_{\text{opt}} = -R^{-1}(\pi_+ C\mathbb{B}\tau\pi_+)^* J\mathbb{C}_{\text{opt}}$, i.e., $u_{\text{opt}}(x_0) = -R^{-1}(\pi_+ C\mathbb{B}\tau\pi_+)^* J y_{\text{opt}}(x_0)$ for all $x_0 \in H$." (Otherwise the current $(\pi_+\mathbb{B}\tau\pi_+)^*$ should be interpreted w.r.t. Z_2^S, not L^2 inner product, thus making the result useless.)

In the proof, use, instead, the substitutions $Z^S := Y^S := L^2(R_+;Y)$, $A := C\mathbb{A}$, $B := C\mathbb{B}\tau = \mathbb{D} - D$, $\tilde{C} := I$ etc.

p. 374, (8.59): $\mathbb{B}$ s.b. $\mathbb{B}\tau$

p. 442, (f4): delete $\mathcal{G}$. (h2): require that $\beta > 0$ (except in the first claim).

p. 494, l. -16: "imply" s.b. "imply in cases 1. and 2.".

p. 531, Prop 9.13.1(e): the uniqueness of S (and $\mathbb{K}$ and $\mathbb{X}$) is again modulo a unit constant operator in $\mathcal{GB}(U)$.

p. 577, l. -5: $>>$ s.b. $>$.

p. 789, Lemma 13.2.1: "Assume that $1 \le p \le \infty$." (e2): (also) the first 2/p should be -2/p. (Enhancement: multiply both new functions, say F and G, by $2^{1/p}$; then they have same H^p norms as the original ones. Moreover, F=g iff G=f. (Multiply F and divide G by $(2\pi)^{-1/p}$ if you want to use the normalized (Haar) measure on the circle.))

p. 882, Lemma A.3.3(s2): $\cap$ should be $\cup$.

3 C. VERY SAFE ERRORS:

(These 1. are almost obvious, or 2. are true but unnecessarily weak, or 3. appear in proofs or other "safe" places. We recommend that the reader corrects to the book the errata listed in Section A., perhaps also those in Section B., whereas those in Section C. are hardly worth the work and only the pages of particular interest should be checked from here. Roughly the same applies to the "Enhancements" section below.)

p. -1: (the cover of Volume 1/3): "B-ring" should be "B-ring tau"

pp. 3-6 ("Contents"): Add 0–5 to the page numbers in the "Contents" list. (All page numbers outside the "Contents" section are correct, including those in the index.)

p. 20: The second "Aexp" should be "tilde-A"

p. 59: (2.27): "dt" should be "(r)dr"
Next line: "$\pi_{(-\infty,t)}$" should be "$\pi_{(-\infty,-t)}$"
Next line: the second and third "t" s.b. "r"

p. 63, (2.32)–(2.33): Z should be $2Z$. p. 84, l. 9 (3.3): the first "L(" should be "(L". l. 16: "for $t \in A_t$" s.b. "for $u \in A_t$". l. 20 (3.5): the first "$= \hat{f}$" should be "$= \Lambda\hat{f}$". l. 24: Ff s.b. $F\hat{f}$. l. 25: "$Ffu = Tfu$ to $Fg = Tg$" s.b. "$F\hat{f}u = \widehat{\mathbb{E}fu}$ to $F\hat{g} = \widehat{\mathbb{E}g}$".

p. 126, l. -5: "$\mathbb{N},\mathbb{M}$" s.b. "$\hat{\mathbb{N}},\hat{\mathbb{M}}$" (both twice).

p. 132, l. 6: "and some t_k smaller than the δ's in (a) and (b))." l. 11,13: $\mathbb{C}$ and $\mathbb{C}^+$ s.b. "$\overline{\mathbb{C}^+}$". l. 16: add "$k \neq n$" before ", so that". l. 18: both 1's should be $\sqrt{2\pi}$.

p. 133, l. 1: "H" s.b. "H^2".

p. 140: "[GL-Crit]" s.b. "[GL73b]".

p. 147, formula (5.13): "$I+g$" s.b. "$I+g*$".

p. 159, (6.13): $\pi_+\tau^t u$ s.b. $\tau^t u$. On the previous line, $\pi_+\tau\mathbb{B}$ s.b. $\pi_+\tau^t\mathbb{B}$.

p. 169: D6.2.3 "and $\mathbb{D} \in B(U,Y)$" s.b. "and $D \in B(U,Y)$".

p. 179, Proof: "(a)&(b)" s.b. "(a1)-(b2)". On the same line, 4.2 and 4.5 s.b. 5.4 and 5.5.

p. 185, Prop6.3.4(a1): "UVR, $\mathbb{D}u :=$" po. "UVR, $\mathbb{D}u =$".

p. 189, below Example 6.3.7: "Σ divided by" s.b. "$\mathbb{C}$ and $\mathbb{D}$ divided by".

p. 191, l. 6: $\mathcal{C}$ s.b. C_c.

p. 197, l. -2: $\mathbb{D} \in L^2$ should be $\mathbb{D}u \in L^2$.

p. 301, formula (7.33) "$\mathbb{M}$" s.b. "$\tilde{\mathbb{M}}$" (twice).

p. 326, l. -15: $\tilde{\Sigma} = [0,0;0,0]$ s.b. $\tilde{\Sigma} = [e^{-\cdot},0;0,0]$.

p. 331, Th7.3.12(c): B s.b. B_1, C^* s.b. C_2^*.

p. 364, l. 15: L^2 s.b. L^2_ε.

p. 377, l. 15: "second and third" s.b. "third and fourth". l. 11: Add superscript d to both sides of the equation.

p. 380, l. -12: "implies all" s.b. "is implied by any".

p. 429, (c3): (iv') s.b. (iv).

p. 447, l. -5: Add "for any $\omega_0 > \omega_A$".

p. 473, Prop 9.8.7(c3): Replace $\mathcal{U}_{out}$ by $\mathcal{U}_*^*$ (or vice versa).

p. 481, (9.128): ")" s.b. "$)_w$".

p. 512, l. -7: add "if $(\cdot - A)^{-1}B$ is replaced by $\widehat{\mathbb{B}\tau}$)" (these need not be equal on $\mathbb{C}^-_{\omega_A}$).

l. -5: "τ^t" s.b. "τ^{-t}"; latter "v" should be "u"

l. -4: latter "$(s-A)^{-1}Bu_0$" s.b. "$(z-A)^{-1}Bv_0$" (l. -3: "t" s.b. "r").

p. 527, l. 7: add $K_{ring}F_{ring}$ below $0I$.

p. 532, l. 7: JK s.b. SK.

p. 538, l. 12: s.b. $Y = H \times H$.

p. 545, l. -13: iR s.b. ∂D.

p. 580, l. -2: u s.b. u_n (twice).

p. 642, l. 5: M_{22} s.b. M_{22}^{-1}. l. 9 & 10: γ^2 s.b. $\gamma^2\|w\|_2^2$

p. 795, l. 9: N s.b. $-N$.

p. 808, l. -2: e^r s.b. e^α.

p. 882, (A3): $\notin$ s.b. $\in$.

p. 886, (R2): (Both) "reflexive" s.b. "separable".

p. 911, l. 9: "are measurable" s.b. "are disjoint and measurable".

p. 921, (B.9): the latter Ω s.b. $\Omega \setminus K$.

p. 944, l. 1: replace "$-F(t)+$" by "$-F(t) = \int_a^{b(t)}[f(t+h,s) - f(t,s)]ds + \int_{b(t)}^{b(t+h)}[f(t+h,s) - f(t,b(t))]ds$". l. 3: replace "$ds-$" by "$ds-h$".

p. 971, (d"): the latter f' should have a hat ($\widehat{f'}$)

p. 983, D.1.24(b): replace "a.e. $r \in E$" by "any point ir of metric density 1 of E (hence for a.e. $ir \in E$)". (This is just an enhancement, but it was used in the proof of L4.1.8.)

p. 984, (D.52): "$=$" s.b. "$\leq$".

p. 987, (E.1): $L^1 \cap L^\infty$ s.b. $L^1 + L^\infty$.

p. 1003, l. 4: add "and $H : Q \to \mathcal{B}(B, B_2)$". l. -8: LF(q)x s.b. (LFx)(q).

p. 1019, l. 9: "Lemma F.1.6" s.b. "Closed-Graph Theorem".

p. 1021, l. 4: "$\hat{\mathbb{D}}$" s.b. "$\hat{F}$". l. 7: The first U s.b. $\mathcal{B}(U)$.

p. 1022, l. 9: U,Y s.b. Y,U

p. 1030: [LR] = Peter Lancaster and Leiba Rodman, Algebraic Riccati Equations, 1995.

4 ENHANCEMENTS:

Upcoming articles by the author enhance remarkably some results on state-feedback stabilizability and output-feedback stabilizability, [quasi-]coprime factorizations and boundary functions. This mostly affects Chapters 7, 10, 6, 9, 4 and 3, in that order.

Some examples are given below:

Chapter 6: A system is optimizable iff it is exponentially stabilizable. Any function having a right factorization has a q.r.c.f.

Chapter 7: An I/O map has a d.c.f. iff it has a stabilizing controller with internal loop, equivalently, iff it has a r.c.f.

p. 333, Prop7.3.14: "and $\mathbb{D}_{21}$ has a d.c.f." is redundant, by [M04b].

Volume 2, several places: "Assume that Z^{s} is reflexive" (and hence outruling $\mathcal{U}_{\mathrm{str}}, \mathcal{U}_{\mathrm{sta}}$) is unnecessary, because Lemma 8.2.3 can be proved by assuming only that Y^{s} is reflexive (thus we can remove U and Z^{s} from Hypothesis 8.2.2), the only exception being that the Banach space $\mathcal{U}(0)$ need not be reflexive (in Lemma 8.2.3(b)); however, when D is J-coercive, then $\mathcal{U}(0)$ is TVS isomorphic to Y^{s}, hence reflexive).

Volume 2: Assume that $U_*^* = U_{out}$ or that $U_*^* = U_{exp}$ and that the system is positively J-coercive. Then there is a J-critical state-feedback pair over U_{out} iff $U_*^*(x_0) \neq \emptyset$ for all $x_0 \in H$.

(In particular, a WPLS is optimizable iff it is exponentially stabilizable.)