Errata for
'Functional Analysis, Spectral Theory, and Applications'
by Einsiedler and Ward.

The authors reiterate their thanks to the many people who sent in comments on early drafts of the book. This file contains errata and some other small changes, for which we thank Menny Aka, Wu Danting, Johannes Hruza, Martina Jørgensen, and Andreas Wieser.

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page 20, lines 8 and 10: the vector space V here should be $\mathbb{R}^d$.

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page 65, fifth line of proof of Lemma 2.67 should read:

$$|x_1 - x_2| < \delta \Longrightarrow |K(f)(x_1) - K(f)(x_2)| < \|f\|_\infty\bigl(\epsilon + \|k\|_\infty\delta\bigr).$$

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page 66, top of page: the first two integrations ending dx should end with dt.

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page 72, line 3: the second α_1 should be α_2

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page 75, first line of proof of Lemma 3.7: The expression $(|f| - |g|)$ should be squared.

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page 81, Exercise 3.20: the word 'empty' should be 'trivial'.

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page 91, line -3: the reference should be to Lemma 2.46 not 2.45.

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page 148, Exercise 5.32: the map Φ is defined on U, so this should read '$H^k(\Phi(U)) \ni f \mapsto f \circ \Phi \in H^k(U)$' ... '$H^k(\Phi(U))$ and $H^k(U)$'.

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page 168, last line of proof of Lemma 6.3: the last $L_1 \circ L_2$ should be $L_2 \circ L_1$.

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page 211, line 10: this should be 'the assumptions on g_0 also give'

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page 293, line 10: this should be 'neighbourhoods of $x_0 \in X$'

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page 297, first sentence in Exercise 8.70(b) should read 'Define

$$\boldsymbol{\partial}_\alpha = (-1)^{\|\alpha|_1}\partial_\alpha^*\colon \mathscr{D}(U) \to \mathscr{D}(U)$$

by $\boldsymbol{\partial}_\alpha F = (-1)^{\|\alpha|_1} F \circ \partial_\alpha$ for all $F \in \mathscr{D}(U)$.'

The purpose of Section 8.5 ('Distributions as Generalized Functions') is to show how locally convex vector spaces are necessary for the theory of distributions. As mentioned, there are different classes of distributions. The one given is not the maximal standard definitions. For example, in the maximal notion,

$$C^\infty(\mathbb{R}) \ni f \longmapsto \sum_{n=1}^{\infty} n f^{(n)}(n) \tag{1}$$

is a distribution. In the topology discussed in Section 8.5, this is not a continuous functional. We indicate here how to modify the locally convex topology on $C_c^\infty(U)$ for an open $U \subset \mathbb{R}^d$ so that (1) becomes a continuous functional. We say that $\mathscr{F} = \left(F_\alpha\right)_{\alpha\in\mathbb{N}_0^d}$ is *allowed* if F_α lies in $C(U)$ for all $\alpha \in \mathbb{N}_0^d$ and, for any compact subset $K \subset U$ we have

$$\left|\{\alpha \in \mathbb{N}_0^d \mid \mathrm{Supp} F_\alpha \cap K \neq \emptyset\}\right| < \infty.$$

For any allowed $\mathscr{F}$ we define a semi-norm by

$$\|f\|_{\mathscr{F}} = \max_{\alpha\in\mathbb{N}_0^d} \|(\partial_\alpha f)F_\alpha\|_\infty.$$

Varying the allowed tuples $\mathscr{F}$ makes $C_c^\infty(U)$ into a different locally convex vector space, and in the case of $U = \mathbb{R}^d$ the functional in (1) is now continuous.

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page 371, Exercise 10.18: this should have the following hint. ‘Show first that $\langle\psi * f, \Phi\rangle = \langle f, \widetilde{\psi} * \Phi\rangle$ for $f, \psi \in L^1(G)$ and $\Phi \in L^\infty(G)$, where $\widetilde{\psi}(g) = \Delta_G(g)^{-1}\psi(g^{-1})$ for $g \in G$ satisfies $\|\widetilde{\psi}\|_1 = \|\psi\|_1$ (see Exercise 10.5 for the definition of Δ_G). Use this to generalize the argument for the discrete case.’

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page 436, proof of Lemma 12.13: the statement ‘$\lambda \notin \sigma_{\mathrm{approx}}(T)$’ should read ‘$\lambda \notin \sigma_{\mathrm{appt}}(T)$’.

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page 564, hint to Exercise 2.61: $C(\overline{D_r})$ should be V_r

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page 566, hint to Exercise 3.53: ‘G can be identified with the group of characters on G’ should read ‘... of Γ’

August 18, 2019