Very incomplete list of errata for V.A. Zorich: *Mathematical Analysis I+II*

M. Müger

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Note that line -5 means line 5 counting from the bottom of the page.

1 Corrections to Volume I

- p. 19, Definition 1: A *relation* $\mathcal{R}$ **between two sets** X **and** Y is a subset of $X \times Y$.
- p. 35, l. -3: Replace 'the set of' by 'a model of the'.
- p. 50, Definition 4: **Real** numbers .... (Anyway, this way of defining rational numbers is just absurd.)
- p. 54. l. 11: Replace '$>$' by '$\geq$'.
- p. 138, first paragraph: Zorich is being vague here: 'grows approximately like...'. Chebyshev proved two things: 1. there are numbers C_1, C_2 such that

$$C_1 \frac{x}{\ln x} \leq \pi(x) \leq C_2 \frac{x}{\ln x}.$$

  2. If $\lim_{x\to\infty} x/\ln x$ exists then it must be equal to 1.
- p. 141, Definition 24: should be '$f \underset{\mathcal{B}}{=} O(g)$ and $g \underset{\mathcal{B}}{=} O(f)$'.
- p. 169, Exercise 4 c): This claim is wrong! For a counterexample see W. M. Boyce: Commuting functions with no common fixed point. Trans. Amer. Math. Soc. **137**, 77-92 (1969).
- p. 283, Theorem 2: It should be noted that this proof was given by C. Fefferman (Amer. Math. Monthly **74**, (1967)) when he was 18.
- p. 285, l. -8: Replace 'larger than' by 'larger than or equal'.
- p. 363, middle of the page: $(x-t)'$ may be confusing. What is meant is the derivative w.r.t. t, thus -1.
- p. 397, l. -3: Replace $g' \cdot g$ by $f' \cdot g$.

2 Corrections to Volume II

- p. 1, Definition 1, b): Replace '$d(x_2, x_2)$' by '$d(x_2, x_1)$'.
- p. 6, Definition 7 is non-standard. Should be: 'A point $a \in X$ is a limit point of the set $E \subset X$ if every neighborhood $O(a)$ of a contains a point of E other than a. (The given definition is not equivalent to the standard one for all metric spaces.)
- p. 18, Exercise 1 b): A metric space is compact iff it is complete and totally bounded. Thus the exercise is not correct as stated.
- p. 20, Exercise 1 b): Not correct as stated!
- p. 24, Definition 5: change to '**complete** metric space (Y, d)'. Furthermore, it is better to replace 'everywhere dense' by 'dense' since later on, mostly 'dense' is used.

- p. 26, Definition 5': change to 'A **complete** metric space ...'.
- p. 49 and following: The notation $\mathcal{L}(X, Y)$ is used both for the set of **all** linear maps from X to Y (page 49) and for the set of **bounded** linear maps (Prop. 2 on page 57). Suggestion: Use $\mathcal{L}(X, Y)$ for the linear and $\mathcal{B}(X, Y)$ for the bounded linear maps.
- p. 73, first line of Subsection 10.4.1: Replace 'several' by 'one'.
- p. 75: The statement of the Corollary is sloppy, since there are also hypotheses on x and h !
- p. 81, Def. 2: The limit should be restricted to $t > 0$ in order (a) to be constistent with most of the literature, (b) to allow for (inward-directed) derivatives at the boundary and (c) because otherwise existence of the directional derivative can fail while one would intuitively expect it.
- p. 84, l. 11: Here the summation convention from volume I, p. 430, should be recalled.
- p. 84, l. -2: Replace '10.4' by '10.3'.
- p. 90, formula (10.74): Replace '$L(x, f(x)f'(x))$' by '$L(x, f(x), f'(x))$'. Similarly in (10.76).
- p. 123, l. 12: Replace

$$-\int_I \chi_{E_1\cap E_2}(x)dx \qquad \text{by} \qquad -\int_I f\chi_{E_1\cap E_2}(x)dx$$

- p. 127, l. - 3 (not counting the footnotes): Correct the LaTeX-mistake, writing

$$\int_Y dy \int_X f(x, y)dx$$

- p. 134, exercise 5: The first sentence should be: Let $f(x, y)$ be a continuous function defined on the rectangle $I = \ldots$ having a continuous partial derivative $\frac{\partial f}{\partial y}$ in I.
- Section 11.5: The non-standard terminology 'of the same type' should be replaced everywhere by a restatement of what is meant. Since this is not always the same (sometimes 'open', sometimes 'bounded open', etc.), this terminology is quite confusing.
- p. 138, l. 3-4: The formula should be

$$\text{supp} f \circ \varphi \cdot |\det \varphi'| = \text{supp} f \circ \varphi = \varphi^{-1}(\text{supp} f)$$

  (Thus a '$\circ$' should be replaced by '=').
- p. 138, l. -5: At the end of the line, there is a ')' missing in front of '$| =$'.
- p. 142, l. -6: Replace '$U(T)$' by '$U(t)$'.
- p. 143: '$I_i \in \{I_i\}$' is very ugly. It is better to replace $\{I_i\}$ by $\mathcal{I}$ throughout the proof (three instances).
- p. 143, first line of (11.14): Replace $I_x \subset D_x$ by $I_x \supset D_x$ as the domain of the second integral.
- p. 147, exercise 3, l. 3: Replace '$\theta =$' by '$\theta \in$'.
- p. 163, l. 8: Replace I_ε^m by I_ε^n.
- p. 176, l. 10: Replace 'tangent plant' by 'tangent plane'.
- p. 178, l. 9: Missing }.
- p. 178, l. 18: Replace 'homemorphic' by 'homeomorphic'.
- p. 187, l. -10: Replace 'becoms' by 'becomes'.
- p. 237, eq. (13.25): Replace '$Q\,Dy$' by '$Q\,dy$'.
- p. 242, eq. (13.30): Replace 'Dz' by 'dz'.

- p. 367, Exam. 7: replace $\lim_{t\to\infty}$ by $\lim_{t\to 0}$.
- p. 379, eq. (16.12): replace $\sin\frac{x}{2}$ by $|\sin\frac{x}{2}|$.
- p. 382: In the diagram (16.17), replace the right vertical limit over by $\mathcal{B}_X$ (instead of $\mathcal{B}_T$).
- p. 403, l. 16: replace h_{h_1} by h_{y_1}.
- p. 452, first paragraph: Using $C_0(\mathbb{R})$ to denote functions of compact support is very non-standard. (Usually this denotes functions that decay at infinity, while $C_c(\mathbb{R})$ denotes the functions of compact support.)
- p. 453, Example 1: In order for $(f * \delta_\alpha)(x)$ to be differentiable at x, f must be continuous in x **and in** $x - \alpha$.
- p. 570, l. -6: LaTeXerror around \index-command.
- p. 590, Exercise 6: The formula $M_1(\phi) = \int x|\varphi|^2(x)dx$ is inconsistent with the definition $M_n(f) = \int x^n f(x)dx$ on p. 589. The former should be replaced by $M_1(|\varphi|^2)$ throughout the exercise.