CORRECTIONS TO "MATRIX GROUPS FOR UNDERGRADUATES"

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I would like to thank to several readers who alerted me to the errors below, including Michael Maltenfort, Brian Hall, Jeff Nunemacher, Andreas Arvanitoyeorgos and Stefan Natu.

- *(Page 12)* Equation 1.3 is only true for $\mathbb{K} \in \{\mathbb{R}, \mathbb{C}\}$.
- *(Page 29)* Exchange f's and g's in the labelling of the horizontal arrows on the commutative diagram in the middle of the page, and also in the commutative diagram at the bottom of the page.
- *(Page 37, line 7)* Replace "$X = (x_1, ..., x_2)$" with "$X = (x_1, ..., x_n)$".
- *(Page 38, 3rd from last line)* Replace "$O(n)$" with "$O(2n)$".
- *(Page 42, middle of the proof)* The sentence, "We showed in the proof of Proposition 3.11 that inner products are determined by norms, so f also preserves inner products," is misleading because it temps one to improperly assume that f is already known to be linear. Instead of Proposition 3.11, use this:

$$2\langle X, Y\rangle = |X|^2 + |Y|^2 - |X - Y|^2 = \text{dist}(X, 0)^2 + \text{dist}(Y, 0)^2 - \text{dist}(X, Y)^2.$$

- *(Page 49, 3rd from last line)* Replace "$\mathcal{O}_n(\mathbb{K})$" with "$\mathcal{O}_d(\mathbb{K})$".
- *(Page 62, Corollary 4.26)* Replace "is" with "its".
- *(Page 65, Ex. 4.12)* Replace "$i < j$" with "$i > j$".
- *(Page 66, Ex. 4.22)* Replace "$a \neq 0$" with "$a > 0$".
- *(Page 66, Ex. 4.24)* Replace "irrational multiple of 2π" with "irrational number".
- *(Page 69, last line of proof)* Replace "$\gamma(t) \cdot \beta'(t)$" with "$\gamma'(t) \cdot \beta(t)$".
- *(Page 70, Proposition 5.6)* Replace "$4n^4$" with "$4n^2$".
- *(Page 82, last paragraph)* Ignore this 3-line paragraph about the sup norm. It not used in the book, and it is not correct.
- *(Page 88, middle of the proof)* Replace "$f(t)\frac{d}{dt}\big|_{t=0} e^{tA}$" with "$f(t)\frac{d}{dt}\big|_{t=0} \det(e^{tA})$"
- *(Page 91, Ex. 6.13)* Replace "is" with "in".

- *(Page 101, Example 7.10)* Replace "irrational multiple of 2π" with "irrational number".
- *(Page 110, Ex. 7.6)* Replace each occurrence of "G^0" with "G_0".
- *(Page 117, 4th line)* Switch the order of the first two elements in the basis for $su(2)$.
- *(Page 118, line 19)* Replace "isomorphims" with "isomorphisms".
- *(Page 120)* Each occurrence of the row-vector (a, b, c) should instead be written as a column-vector.
- *(Page 124, second line)* Replace "isometry G" with "isometry of G".
- *(Page 124, Theorem 8.15)* Add the hypothesis that H is closed.
- *(Page 128, first line of proof)* Replace "by Exercise 4.15" with "by Proposition 4.29".
- *(Page 133, Ex. 8.12.1)* Replace "$\gamma'(t) = 0$" with "$\gamma'(0) = 0$".
- *(Page 135, line 7)* Replace "an elements of" with "an element of".
- *(Page 139, middle of page)* The sentence "...the idea generalizes to any dimension" is a bit misleading, since the dimension 2 proof that is provided lacks one ingredient which is required in the general proof. For general dimension, after picking $v_1, \ldots, v_l$, choose v_{l+1} so that the orthogonal distance from v_{l+1} to $\text{span}\{v_1, ..., v_l\}$ is non-zero but minimal.
- *(Page 150, Case 1 of proof)* The proof fails to address the possibility that the denominator of $Z = \frac{v+\overline{v}}{|v+\overline{v}|}$ vanishes. In this case, the components of v are imaginary, so one should instead define $Z = \frac{\mathbf{i}v}{|\mathbf{i}v|}$.
- *(Page 154)* Each occurrence of the row-vector (a, b, c) should instead be written as a column-vector.
- *(Page 157, Definition 9.27)* Replace the inadequate definition of regular given in the text with this:

  Definition 9.27 1. *The element $x \in T \subset G$ is called regular if:*
  1. *(for $G = U(n)$) its angles are all distinct.*
  2. *(for $G = SU(n)$) its angles are all distinct, including the final summed angle.*
  3. *(for $G = Sp(n)$) its angles are all distinct and none equals 0 or π.*
  4. *(for $G = SO(2n+1)$) no angle equals plus or minus another angle.*
  5. *(for $G = SO(2n)$) no angle equals plus or minus another angle, and at most one lies in $\{0, \pi\}$.*

- *(Page 160, paragraph after Thm 9.34)* Remove this paragraph, which incorrectly claims that simply connected Lie groups are isomorphic to matrix groups.