ERRATA FOR
AN INTRODUCTION TO AUTOMORPHIC REPRESENTATIONS

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Chapter 1

§1.10. The right hand side of the displayed equation in Proposition 1.10.7 should read

$$\{H(k^{\mathrm{sep}})g \in H(k^{\mathrm{sep}})\backslash G(k^{\mathrm{sep}}) : g\xi(g^{-1}) \in H(k^{\mathrm{sep}}) \text{ for all } \xi \in \mathrm{Gal}_k\}.$$

Pointed out by Bobby (Zixuan) Zhang.

Chapter 3

§3.2. After Theorem 3.2.3, $\frac{dg}{dh}$ should be $\frac{d_r g}{d_r h}$.

Chapter 4

§4.4. In the definition of a $(\mathfrak{g}, K)$-module on p. 115-116 one has to assume that all of the representations $K \to \mathrm{GL}(W)$ are continuous, where we give W the canonical topology. Pointed out by Yihang Zhu.

Between Theorem 4.4.14 and Lemma 4.4.15 "smooth vectors" should be "K-finite vectors." Pointed out by Ryan Chen.

§4.6. Before Corollary 4.6.3, we must assume K is connected to deduce that $Z(\mathfrak{g})$ commutes with the action of K. Taking $K = \mathrm{O}_2(\mathbb{R})$ and V to be the standard two-dimensional representation provides a counterexample. Thus in Corollary 4.6.3 we have to assume that K is connected to deduce the existence of the infinitisimal character. Pointed out by Ryan Chen.

§4.7. In the definition of the $(\mathfrak{g}, K)$-module the generators H, X, Y must be replaced by appropriate Cayley transforms as in [Bum97, §2.5]. Pointed out by Andrea Bourque.

Chapter 8

§8.3. In the proof of Proposition 8.3.1, the map ev_1 is not $M(F)$-equivariant. It is only equivariant up to a twist by $\delta_P^{-1/2}$. Because of this twist, the map $\mathrm{ev}_1 \circ (\cdot)_N$ is equivariant as claimed. Pointed out by Marie-Hélène Tome. Alternate reference: [Lau96, Lemma D.3.3].

Representation is misspelled in Theorem 8.3.2.

Theorem 8.3.2 is not used in the proof of Theorem 8.3.5

In Theorem 8.3.6, π should be (π, V) and V' should be V. Pointed out by Nir Elber.

§8.4. Above (8.18) "any collection of square-integrable" should be "any collection of essentially square integrable."

§8.5. In the last paragraph of p. 227, if V is merely smooth, then the natural map $V \otimes V^\vee \to \mathrm{End}_{\mathrm{sm}}(V)$ need not be surjective. A countable direct sum of the trivial representation provides a counterexample. If V is admissible, then the natural map $V \otimes V^\vee \to \mathrm{End}_{\mathrm{sm}}(V)$ is an isomorphism. Pointed out by Nir Elber.

In the proof of Proposition 8.5.3, we show that $\beta \circ \beta' \neq 0$. But we need that $\beta' \circ \beta \neq 0$. Instead, see [Lau96, Proposition D.4.7]. Pointed out by Nir Elber.

Exercises. In Exercise 8.12, χ should be a quasi-character of $G(F)$, not $Z_G(F)$. Pointed out by Nir Elber.

Chapter 9

§9.5. On p. 262, in the proof of Theorem 9.1.2, it is not true that $R(f)\varphi \neq 0$ implies that φ is fixed by K. The correct statement is that $R(f)$ preserves $L^2_{\mathrm{cusp}}([G])^K$ and maps $L^2_{\mathrm{cusp}}([G])$ to $L^2_{\mathrm{cusp}}([G])^K$. This is enough for the purposes of the proof. Pointed out by Nir Elber.

Chapter 12

§12.1. The definition of the topology on the Weil group of a local non-Archimedean field is incorrect. See [Tat79, (1.4.1)] for the correct topology. Pointed out by Jhan-Cyuan Syu.

Chapter 13

§13.4. Above (13.5), "left $\mathbb{C}$-linear action of $\mathrm{Gal}(E/F)$..." should be "left $\mathbb{C}$-linear action of Gal_F..."

§13.4. In Theorem 13.4.2, $\mathrm{GL}_n(\mathbb{A}_F)$ should be $\mathrm{GL}_n(\mathbb{A}_E)$. Pointed out by Ruichen Xu.

Chapter 15

§15.4. In the definition of df both sums should begin at $i = 0$. Pointed out by Ryan Chen.

Chapter 17

§17.3. The standing assumption is that H is a smooth *affine* algebraic group. With the exception of §3.11, and Example 12.1 every group scheme in the book is assumed to be affine. Pointed out by Bobby (Zixuan) Zhang.

§17.4. The sentence after Lemma 17.4.1 should read "Taking $I = H_\gamma$, we see that the set of classes in the geometric class of γ is in bijection with $\mathcal{D}(k, H_\gamma, H)$." Pointed out by Bobby (Zixuan) Zhang.

Chapter 18

§18.6. In the last displayed equation on p. 491 f should be f_x. Pointed out by Bobby (Zixuan) Zhang.

Appendix A

§A.1. After the last displayed equation on p. 527, the sentence "Since we assumed the residual characteristic of k_0 is not 2..." should be changed to "Since we assumed the characteristic of k_0 is not 2..." Pointed out by Bobby (Zixuan) Zhang.

References

[Bum97] D. Bump. *Automorphic forms and representations*, volume 55 of *Cambridge Studies in Advanced Mathematics*. Cambridge University Press, Cambridge, 1997. 1

[Lau96] G. Laumon. *Cohomology of Drinfeld modular varieties. Part I*, volume 41 of *Cambridge Studies in Advanced Mathematics*. Cambridge University Press, Cambridge, 1996. Geometry, counting of points and local harmonic analysis. 1, 2

[Tat79] J. T. Tate. Number theoretic background. In *Automorphic forms, representations and L-functions (Proc. Sympos. Pure Math., Oregon State Univ., Corvallis, Ore., 1977), Part 2*, Proc. Sympos. Pure Math., XXXIII, pages 3–26. Amer. Math. Soc., Providence, R.I., 1979. 2

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