Preface to the First Edition

Well, finally, here it is—the long-promised *Revenge of the Higher Rank Symmetric Spaces and Their Fundamental Domains*. When I began work on it in 1977, I would probably have stopped immediately if someone had told me that 10 years would pass before I would declare it "finished." Yes, I am declaring it finished—though certainly not perfected. There is a large amount of work going on at the moment as the piles of preprints reach the ceiling. Nevertheless, it is summer and the ocean calls. So I am not going to spend another 10 years revising and polishing. But, gentle reader, do send me your corrections and even your preprints.

I said it all in the Preface to Volume I [612]. So I will try not to repeat myself here. Yes, the "recent trends" mentioned in that Preface are still just as recent. And there are newer, perhaps even more pernicious tendencies here in the USA. This is the age of the billion dollar "defense" funding of research, the "initiatives" to put more power and money in the hands of fewer and fewer, the boondoggles to spend huge sums on supercomputers and to bring space war movies into the university. Yes, and compartmentalized research is still in the ascendancy. But I do not feel much happier looking at the international mathematical community that just declared most female, minority, and third world mathematicians unfit to speak at the international congress in Berkeley last summer. Oh well, many fields were not represented either. But, for me, the best conference is one run democratically and covering a wide spectrum of viewpoints, a conference in which anyone who wishes can speak on their research. Infinite diversity in infinite combinations!

Well, so much for purple prose. Clearly I am hoping for some forgiving readers. I also need readers who are willing to work out lots of exercises on a large variety of topics. Yes, once more there are lots of exercises. But, isn't it boring to read other people's proofs? In Chapter 1 this can mean some rather complicated calculations on matrix space. In Section 2.1 of Chapter 2, this will require some familiarity with beginning differential geometry—tangent spaces, differentials, and the like. Some parts of Section 2.2 of Chapter 2 will demand a little knowledge of beginning algebraic number theory.

Perhaps I should repeat one thing from the Preface to Volume I—the warning that I am very bad at proofreading. And the formulas in Volume II are much worse than in Volume I. So please do remember this when a formula looks weird.

Thanks again to all who helped me write this. You know who you are, I hope. Live long and prosper!

Encinitas, CA, USA Audrey Terras
August 1987

Preface to the Second Edition

It is marvelous and a bit scary to return to this garden after 17 years or so. Sadly many people such as Serge Lang, Hans Maass, and Atle Selberg are now gone. But there are many new flowers. Many more women are working in this field. Yeah! The books of Jorgenson and Lang [333], [334], as well as that of Elstrodt et al. [168] are welcome. So also is that of Goldfeld [230]. Thanks to younger people, there are even computations of automorphic forms for $GL(n, \mathbb{Z})$, when $n = 3$ and 4. See the website:

www.lmfdb.org

for many computations of higher rank modular forms and L-functions. There is much new work on random matrices. And, of course, there are many adelic books and papers.

I had hoped that this edition would be finished in the summer of 2013. It took more time than I expected to finish updating Volume II. There have been many changes since 1987 as I noted in the preface to Volume I and much lack of progress as well. I will not discuss adelic representation theory here either. I am still hoping that this volume is friendlier than works requiring adelic group representations. And, once again, I leave much to the reader. There is still no answer book for the exercises. Sorry.

I have added a few new sections, including one on Donald St. P. Richards' central limit theorem for $O(n)$-invariant random variables on the symmetric space of $GL(n, \mathbb{R})$, another on random matrix theory, and some discussions of mostly non-adelic advances in the theory of automorphic forms on arithmetic groups since 1987.

I should very belatedly thank Walter Kaufmann-Bühler for the translations of French and German that appear in the footnotes. We miss him very much. And, once more, I thank the Scientific Workplace people for allowing me to refuse to learn TEX and thus making the work on this book a much more pleasurable experience.

I am very grateful to Aloys Krieg and Anton Deitmar who bravely sent me long lists of errors at least 25 years ago. Sorry it took so long, but I hope that finally I managed to correct them all. I am also extremely grateful to Andrew Odlyzko and

Andrew Booker for sending me Figure 1.2 and Figure 1.32, respectively, which give evidence for some of the most interesting conjectures touched on in this volume.

There are lots of other people I should thank, especially my POSSLQ and my students.

When I refer to Volume I, now I will always refer to the new edition [612]. It should go without saying that it will be assumed that the reader has some acquaintance with Volume I.

Live long and prosper!

Encinitas, CA, USA
August 2015

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