Preface

This book grew from my lecture notes for a short course I gave at the Arizona Winter School in March 2010. My aim has been to present an exposition accessible to students in their second or third year of graduate school, while also providing a one-stop reference for active researchers in arithmetic and non-archimedean dynamics. In particular, I do not assume the reader has any prior familiarity with the basics of dynamics, with non-archimedean analysis, or with Berkovich spaces. I *do* assume the reader has already seen some non-archimedean fields, usually the p-adic numbers and hopefully the complete, algebraically closed p-adic field $\mathbb{C}_p$, but even those topics are reviewed briefly in Chapter 2.

The theory of p-adic dynamics, and more generally, non-archimedean dynamics, is modeled on the theory of complex dynamics. Naturally, a student of complex dynamics is expected to have already completed a full course on complex analysis. For the sake of argument, though, one could probably learn quite a bit of complex dynamics with minimal prior complex analysis coursework if one were willing to accept certain analytic facts on faith. It would of course be unwise to try to approach complex dynamics that way, but my point is that it *could* be done.

The same is true of non-archimedean dynamics: mastery of the subject requires fluency in non-archimedean analysis, but getting started requires far less background. In practice, after all, most students of non-archimedean dynamics learn non-archimedean analysis along the way, not as a prerequisite. Or at least, that was how *I* learned it.

Thus, this book interleaves the basics of non-archimedean analysis and of elementary dynamics with the main topics of non-archimedean dynamics. For example, the more advanced theory relies heavily on the Berkovich

projective line, discussed in Chapter 6. However, a lot can be done with less background, and therefore the fundamentals of non-archimedean dynamics appear earlier, in Chapter 4.

In addition, even in the exposition of non-archimedean analysis (Chapter 3) and Berkovich's theory (Chapters 6 and 7), I defer the more involved proofs to later chapters (specifically, Chapters 14–16). My aim is to acquaint the reader with the requisite analysis as quickly as possible before returning to our primary topic of dynamics. At the same time, a reader who wishes to see those proofs can easily find them by flipping to the back of the book.

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