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Spectral Methods of Automorphic Forms

Automorphic forms are a major topic of analytic number theory. This text combines various techniques from the field, discussing estimates for Fourier coefficients of automorphic forms, the theory of Kloosterman sums, the Selberg trace formula, and the theory of small eigenvalues. Automorphic forms are one of the central topics of analytic number theory. In fact, they sit at the confluence of analysis, algebra, geometry, and number theory. The first edition of this volume was respected, both as a textbook and as a source for results, ideas, and references. It helped to spark a growing interest in the mathematical community to bring it back into print. In this second edition, Iwaniec treats the spectral theory of automorphic forms as the study of the space $L (H\Gamma)$, where H is the upper half-plane and Γ is a discrete subgroup of volume-preserving transformations of H. He combines various techniques from analytic number theory. Among the topics discussed are Eisenstein series, estimates for Fourier coefficients of automorphic forms, the theory of Kloosterman sums, the Selberg trace formula, and the theory of small eigenvalues. Harmonic analysis on the Euclidean plane. Harmonic analysis on the hyperbolic plane. Fuchsian groups. Automorphic forms. The spectral theorem. Discrete part. The automorphic Green function. Analytic continuation of the Eisenstein series. The spectral theorem. Continuous part. Estimates for the Fourier coefficients of Maass forms. Spectral theory of Kloosterman sums. The trace formula. The distribution of eigenvalues. Hyperbolic lattice-point problems. Spectral bounds for cusp forms. Classical analysis. Special functions. References. Subject index. Notation index

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