## Aspects of Representation Theory and **Noncommutative Harmonic Analysis**

This book presents the theory of harmonic analysis for noncommutative compact groups. If G is a commutative locally compact group, there is a well-understood theory of harmonic analysis as discussed in Aspects of Harmonic Analysis on Locally Compact Abelian Groups. If G is not commutative, things are a lot tougher. In the special case of a compact group, there is a deep interplay between analysis and representation theory which was first discovered by Hermann Weyl and refined by Andre Weil. This book presents these seminal results of Weyl and Weil.

Starting with the basics of representations theory, it presents the famous Peter-Weyl theorems and discusses Fourier analysis on compact groups. This book also introduces the reader to induced representations of locally compact groups, induced representations of G-bundles, and the theory of Gelfand pairs. A special feature is the chapter on equivariant convolutional neural networks (CNNs), a chapter which shows how many of the abstract concepts of representations, analysis on compact groups, Peter-Weyl theorems, Fourier transform, induced representations are used to tackle very practical, modern-day problems.

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