too can cartesian diagrams." The reader will also have difficulty in many places where letters which should be adorned with bars or tildes (thus, $\bar{H}$ or $\tilde{C}$) appear without their adornments, and thus look as if they mean something else.

This brief sample of small errors of typography and presentation are given to warn the reader that he will need to study the text very carefully, not only for its mathematical content. They are not intended to disparage the undoubted value of this book to all those concerned with this important branch of algebraic topology.

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Harmonic analysis on real reductive groups, by V. S. Varadarajan, Lecture Notes in Math., vol. 576, Springer-Verlag, Berlin, Heidelberg, New York, 1977, 521 pp., $17.20.

The study of harmonic analysis on real semisimple Lie groups has proceeded in three major currents. One of these has been via the study of more general locally compact groups. There are, for example, general results about character theory, induced representations, and the Plancherel theorem. Good references for this work are the books of Dixmier and Mackey [3], [8].

In the other extreme, there have been studies of specific groups, most frequently $SL(2, R)$, the group of 2×2 real matrices with determinant one. Although this is the simplest possible example of a semisimple real Lie group, studies of $SL(2, R)$, two of the earliest being papers by E. Wigner in 1939 and V. Bargmann in 1947, provided invaluable inspiration for the general theory [2], [13].

Finally, there has been the study of real semisimple Lie groups in general. The pioneering work in this area is due almost entirely to Harish-Chandra. This work exploits the rich structure theory of semisimple groups and the connections between analysis on these groups and the abelian Fourier analysis on their Lie algebras and Cartan subgroups.

The building blocks of harmonic analysis are irreducible unitary representations. The set $\hat{G}$ of equivalence classes of irreducible (continuous) representations of a locally compact group G is called the unitary dual of G. For $\pi \in \hat{G}$ and $f \in L^1(G)$, the operator-valued Fourier transform of f is given by $\pi(f) = \int_G f(x)\pi(x)\,dx$, where dx is Haar measure on G. The scalar-valued Fourier transform is $\hat{f}(\pi) = \operatorname{trace} \pi(f)$, if $\pi(f)$ has a well-defined trace as an operator on the representation space.

A Plancherel measure for G is a positive measure on $\hat{G}$ such that for $f \in L^1(G) \cap L^2(G)$, $\|\pi(f)\|$ is finite for μ-almost all $\pi \in \hat{G}$, and $\int_G |f(x)|^2 dx = \int_{\hat{G}} \|\pi(f)\|^2 d\mu(\pi)$. Here $\|\cdot\|$ denotes the Hilbert-Schmidt norm. Plancherel's theorem says that for a large class of locally compact groups (including compact and semisimple Lie groups, see [3]), Plancherel measure exists on $\hat{G}$, and is unique once a Haar measure dx on G is fixed. An easy