Langlands, R. P.
On the classification of irreducible representations of real algebraic groups. (English)
Zbl 0741.22009
Representation theory and harmonic analysis on semisimple Lie groups, Math. Surv. Monogr. 31, 101-170 (1989).

[For the entire collection see Zbl 0722.00012.]

This paper appears in the AMS volume whose purpose is to first and finally publish some venerable papers in representation theory. The present paper, now nearly twenty years old, establishes what is now called the Langlands classification of representations of real groups in terms of tempered representations. In the interim, other accounts of this have appeared, notably the monographs of Borel-Wallach, Knapp and Wallach. These achieve the representation theoretic results in very much the same spirit and technique as the original. However, the books of Knapp and Wallach develop the representation theory whereas Borel-Wallach and Langlands assume acquaintance with Harish-Chandra. More significantly, the books are not, in their purpose, concerned with the motivation for the paper, viz. the relation of representation theory to automorphic forms. With this perspective, the author spends the first thirty-three pages of the paper on L-groups and homomorphisms for Archimedean fields before defining the representations associated with L-group data. Ultimately he proves that the L-packets of representations thus defined are finite, disjoint and exhaust the set of irreducible representations considered. Despite other treatments of L- group theory over general fields [cf. Proc. Symp. Pure Math. 33, No. 2, 205-246 (1979; Zbl 0447.12009)] the treatment here is very readable, informative and worthwhile. Overall, this seminal paper is a classic.

Reviewer: M.J.Heumos (New York)

MSC:

22E45	Representations of Lie and linear algebraic groups over real fields: analytic methods
11F70	Representation-theoretic methods; automorphic representations over local and global fields
22E47	Representations of Lie and real algebraic groups: algebraic methods (Verma modules, etc.)
11R39	Langlands-Weil conjectures, nonabelian class field theory

Cited in **4** Reviews
Cited in **135** Documents

Keywords:

Langlands classification of representations of real groups; tempered representations; automorphic forms; L-groups; homomorphisms for Archimedean fields; L-packets of representations; irreducible representations