Benoist, Yves

Automorphisms of convex cones. (Automorphismes des cônes convexes.) (French)

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Invent. Math. 141, No. 1, 149-193 (2000).

The author studies the subgroups of $GL(m,\mathbb{R})$ preserving a properly convex cone of $\mathbb{R}^m$ and whose action on $\mathbb{R}^m$ is irreducible. Let Γ be a subgroup of $GL(m,\mathbb{R})$, preserving the properly convex cone $C \subset \mathbb{R}^m$. If C is strictly convex and $\Gamma \setminus C$ is compact then the Zariski closure G of Γ is either $GL(m,\mathbb{R})$ or the similitude subgroup of a Lorentzian quadratic form on $\mathbb{R}^m$. Then one describes the Zariski closure G of Γ under the hypothesis that the action on $\mathbb{R}^m$ is irreducible. It follows that G is a semisimple Lie group and $\mathbb{R}^m$ is an irreducible representation of G. The irreducible representations of this kind are characterized by the following properties: the representation is proximal and the highest weight λ does not coincide "modulo 2" with the restricted highest weight of an irreducible symplectic proximal representation. The results are used to describe the group G corresponding to a group Γ for which all the eigenvalues are strictly positive, e.g. $G = GL(m,\mathbb{R})$ if and only if $m \neq 2$, modulo 4.

Reviewer: Vasile Oproiu (Iaşi)

MSC:

22E15	General properties and structure of real Lie groups
22E46	Semisimple Lie groups and their representations
20G20	Linear algebraic groups over the reals, the complexes, the quaternions

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properly convex cone; Zariski closure; semisimple Lie group; irreducible representation

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