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Introduction to endoscopy. (English) Zbl 1161.22010

Arthur, James (ed.) et al., Representation theory of real reductive Lie groups. AMS-IMS-SIAM joint summer research conference, Snowbird, UT, USA, June 4–8, 2006. Providence, RI: American Mathematical Society (AMS) (ISBN 978-0-8218-4366-6/pbk). Contemporary Mathematics 472, 175-213 (2008).

From the introduction:

"Many questions about noncommutative Lie groups boil down to questions in invariant harmonic analysis: the study of distributions on the group that are invariant by conjugacy. The fundamental objects of invariant harmonic analysis are orbital integrals and characters. For various reasons (among which is the trace formula), one calls "geometric" the objects related to conjugacy classes and orbital integrals, and "spectral" the objects related to representations and characters.

In the Langlands program a cruder form of conjugacy called stable conjugacy plays a role. The study of Langlands functoriality often leads to correspondences that are defined only up to stable conjugacy. Endoscopy is the name given to a series of techniques aimed to investigate the difference between ordinary and stable conjugacy. The word "endoscopy" has been coined to express that we want to see ordinary conjugacy inside stable conjugacy. The aim is to recover orbital integrals and characters from their stable avatars on a family of auxiliary groups called endoscopic groups."

"In this series of lectures we shall introduce the basic notions of local endoscopy: stable conjugacy, κ-orbital integrals, endoscopic groups, endoscopic transfer of orbital integrals and its dual for characters, with an emphasis on the case of real groups, following the work of Diana Shelstad".

For the entire collection see [Zbl 1148.22001].

Reviewer: Anatoly N. Kochubei (Kyïv)

MSC:

22E50 Representations of Lie and linear algebraic groups over local fields
22E30 Analysis on real and complex Lie groups

Keywords:

endoscopic groups; orbital integrals; stable conjugacy