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Abstracts of Plenary and Invited Lectures

Section:

7. Lie Groups and Lie Algebras

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Topological Methods in Representation Theory

In this talk we survey topological methods, all related to Morse theory, and the way they are applied in representation theory of reductive Lie groups. The point of view we take was first proposed by Kashiwara as a series of conjectures in 1987. It extends the theory of Beilinson-Bernstein which was explained by Beilinson in his lecture at the ICM in Warsaw in 1983. The Beilinson-Bernstein theory reduces questions in representation theory to complex algebraic geometry, whereas our point of view leads us to geometry over the reals. Our results, which constitute joint work with Wilfried Schmid, include two geometric formulas for characters of representations and a proof of the Barbasch-Vogan conjecture.