

UNITARY REPRESENTATIONS AND THE ATLAS OF LIE GROUPS

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ABSTRACT. Representations of real reductive Lie groups have long been studied. Of particular interest are their unitary representations. Harish-Chandra in the 1950's showed that the representations that admit Hermitian forms form can be understood by restricting to a maximal compact subgroup. The restriction is nice enough that you can gain some control on the signature of the representation. These representations are called admissible. Knapp and Zuckerman classified some and then, Langlands and Vogan independently gave a parameterization of all admissible representations of a real reductive Lie group. The problem of which ones are unitary has been an elusive problem for a long time. Thanks to some recent results the problem can be solved for a particular group of a given rank in a finite but large amount of calculations.

The Atlas of Lie groups was created to try to attack the problem. I will say a little about the software and its potential for learning the theory.