

Invariant Differential Operators and Representation Theory

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Dedicated to IGOR KLUVANEK

1 Introduction

In this lecture I outlined how some results in the representation theory of the noncompact semisimple Lie group $SU(n+1, 1)$ were related to harmonic analysis on the Heisenberg group. The guide we use is the example of analysis on the real line viewed as the boundary of the upper half-plane. The Heisenberg group can be identified with the boundary of a Siegel domain. For each of the following ingredients of classical analysis on the upper half-plane, we seek an analogue in the setting of harmonic analysis on noncompact symmetric spaces. They are:

1. the Cauchy-Riemann operator ;
2. the fact that the real and imaginary parts of a holomorphic function are conjugate harmonic functions ;
3. the boundary values of these functions;