

William D. Kirwin (Universität zu Köln and Instituto Superior Técnico, Lisboa)

Parallel transport and the Peter-Weyl theorem as the momentum space representation for a compact Lie group

Abstract

Let K be a compact Lie group. As is well known, $L^2(K)$ can be interpreted as the “position-space” geometric quantization of K . In this talk, I will describe a “momentum-space” representation for K . I will also explain how this momentum-space representation is linked to the position-space representation via parallel transport with respect to a canonical connection in a certain Hilbert bundle. In particular, it is a result of Florentino-Matias-Mourão-Nunes that parallel transport along a particular geodesic from position-space to an intermediate fiber is exactly the generalized Segal-Bargmann(-Hall) transform. I will explain how their result can be extended to any other interior fiber (thus obtaining generalized Segal-Bargmann transforms), and moreover that when extended to momentum space, parallel transport yields the Peter-Weyl decomposition. This is joint work with S. Wu.