

Research plan

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- (1) The local orbit types of orbits of the isotropy representations for semisimple pseudo-Riemannian symmetric spaces

We investigate hyperbolic orbits and elliptic orbits of the isotropy representations for semisimple pseudo-Riemannian symmetric spaces in terms of the restricted root systems with respect to maximal split abelian subspaces and their Satake diagrams. We plan to determine the set of all local orbit types of hyperbolic orbits or elliptic orbits of the isotropy representations for all irreducible semisimple pseudo-Riemannian symmetric spaces.

- (2) Special Lagrangian submanifolds in pseudo-Riemannian geometry

The notion of an austere submanifold was introduced by Harvey-Lawson. We introduce the notion of an austere submanifold in a pseudo-Riemannian manifold, which is a pseudo-Riemannian submanifold where for each normal vector, the spectrum of the complexification of its shape operator is invariant under the (-1) -multiple. Our examples of austere pseudo-Riemannian submanifolds are orbits of the isotropy representations of semisimple pseudo-Riemannian symmetric spaces. In Riemannian geometry, one can construct special Lagrangian submanifolds of \mathbb{C}^n from austere submanifolds. We will explicate the notion of special Lagrangian submanifolds in pseudo-Riemannian geometry.