VISUALIZATION OF GEODESIC SPHERES OF COMPLEX HYPERBOLIC PLANE WITH RESPECT TO VARIOUS LEFT-INVARIANT METRICS

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ABSTRACT. Complex hyperbolic space is a symmetric space of negative sectional curvature; therefore, it can be viewed as a connected solvable real Lie group with a left-invariant metric [1]. All possible left-invariant Riemannian metrics on this Lie group have been classified recently [2]. We consider geodesics in a special 4-dimensional case of the Complex hyperbolic plane with different left-invariant metrics. Using the Euler–Arnold equation one can simplify the system of 2nd order differential equations of geodesics on a Lie group to a system of 1st order differential equations on its Lie algebra. By solving these equations numerically, we can visualize geodesic spheres.

References

1. E. Heintze, *On Homogeneous Manifolds of Negative Curvature*, Math. Annalen **211** (1974), 23–34.
2. A. Dekić, Marijana Babić, Srdjan Vukmirović, *Classification of Left Invariant Riemannian Metrics on Complex Hyperbolic Space*, Mediterranean Journal of Mathematics, to appear 2022.

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