

Linear Fractional Maps and Bounded Symmetric Domains

Linear fractional maps are a well known class of operators in \mathbb{C}^n . They generalise Möbius mappings and are related to automorphisms of the ball. They have been studied by Krein and Smuljan, Potapov, and more recently by Harris [Indiana Univ. M. J., 1992] and Bracci and Bisi [Adv. Math., 2002]. They are a large class of self-maps of the ball which are not automorphisms but are nevertheless easy to handle. There are connections to composition operators and the study of fixed point free holomorphic maps.

In this project, we want to define the notion of a linear fractional map on a JB*-triple (whose open unit ball is a bounded symmetric domain [Kaup, 1977]). Following this, we will examine the decomposition of a linear fractional map and their relationship with composition operators on the underlying domain. This will extend work by Cowen and MacCluer [Acta. Sci. Math. Szeged, 2002], and Bisi and Bracci on the finite dimensional Hilbert ball, and also work of Harris in the setting of operator spaces. We may also examine the natural domains associated with a given linear fractional transformation.

Background: The potential student for this project will benefit from a strong background in complex and functional analysis. Operator theory and algebraic structures would also be an advantage.

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