ABSTRACT FLAT PROJECTIVE DIFFERENTIAL GEOMETRY.

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Introduction. In an earlier paper, Michal[1] has defined an abstract projective curvature form in a Hausdorff space having coordinates in a Banach space with inner product, under the condition that the associated Banach ring of linear functions possess a contraction operation. The basis for a general flat projective geometry under the same restrictions was also sketched in the same paper. More recently the authors[2] have considered a general geometry of paths in which the concept of projective connection and projective curvature form was generalized to geometric spaces having coordinates in Banach spaces without independently postulated inner product or contraction.

In the present paper we study an abstract flat projective geometry from two initial viewpoints. In the first, which is developed in sections one and two, we begin with a general geometric space with postulated allowable and preferred (projective) coordinate systems. We then show that transformations from allowable to projective coordinates determine in their domains the solutions of a characteristic second order differential system. The latter involves a projective linear connection which determines an identically vanishing projective curvature form. Our second approach seeks to characterize locally the projective coordinate systems by means of a second order differential system. In developing this other viewpoint in the third and fourth sections we assume that our geometric space is a Hausdorff topological space, and establish existence theorems for the solution of

[1] Michal III. Roman numerals refer to the bibliography at the end of the paper.

[2] Michal and Mewborn VII.