Smith, James T. 1971. Foundations of metric geometry of arbitrary dimension. Abstract. In International Congress for Logic, Methodology and Philosophy of Science 1971, 77–78.

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of elements in P such that

Q1. = Pl.

Q2. for every x, x∈P iff $x = \bigcup_{t\in T} x_t \cap e_t$, where $x_0 = V$, $x_t \in B$, $x_t \leq x_{t'}$ for $t \geq t'$, t, $t' \in T$,

Theorem 1. P_0 - lattice of type T is a generalized Post algebra of type T iff the following condition is satisfied

Q3. if a∈B and for some $t' \in T$, $a \cap e_{t'} = \bigcup_{t<t'} e_t$, then $a = \lambda$.

Theorem 2. Let P be a generalized Post algebra of type T, where $\overline{\overline{T}} \leq \aleph_0$, then for every enumerable set (Q) of infinite joins and meets in P there exists a Q - isomorphism h from P into a Post field R of subsets of a topological space X.

Theorem 3. Let M be an arbitrary infinite cardinal number. M - complete generalized Post algebra of type T, where $\overline{T} \leq M$, is M - representable if and only if the Boolean algebra of all complemented elements in P is M - representable.

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FOUNDATIONS OF METRIC GEOMETRY OF ARBITRARY DIMENSION

Metric geometry is the study of structures that satisfy Hilbert's Incidence Axioms and some simple orthogonality axioms, admit reflections in all points and lines, and satisfy the Three-Reflections Principles. Axioms can be phrased in terms of points, lines, etc. - the synthetic approach- or in terms of motions- the group theoretic approach. Foundations of both types for the two and three dimensional cases are well-known achievements of Bachmann and others. Kinder (Diss., Kiel, 1965) has recently given a group theoretic foundation for the arbitrary finite dimensional case. The present paper gives a synthetic foundation for metric geometry of arbitrary dimension. The undefined notions are "point", "line", "plane", and "orthogonality" of two lines. The axioms are Hilbert's Incidence Axioms, Lenz's Orthogonality Axioms (Math. Ann., 1962), modified to admit elliptic models, axioms stating the existence of all point and line reflections, and the Three-Reflections Principles.

By a result of Wyler (Duke J., 1953), a metric geometry can be embedded in a projective "ideal" geometry. By standard coordinatization theory, the ideal geometry is isomorphic with the analytic projective geometry of subspaces of a vector space over a division ring of scalars. By standard coordinatization theory, the ideal geometry is isomorphic with the analytic projective geometry of subspaces of a vector space over a division ring of scalars. By arguments of Lenz, the orthogonality relation can be represented by a Hermitian form. Well-known two dimensional results are applied to show that the ring of scalars is a commutative field whose characteristic is not two, and that the Hermitian form is bilinear. Thus a representation theorem is obtained: the metric geometries are the structures isomorphic to certain subgeometries of affine or projective metric geometries. These coincide in the finite dimensional case with the metric subdomains studied by Klopsch (Diss., Kiel, 1968); therefore, in this case, the present axiom system is equivalent to Kinder's.

Reflections in arbitrary flats are studied in detail. A flat x is called orthocomplemented if each point of the geometry lies in some perpendicular to x. There is a reflection in x if and only if x is orthocomplemented; in this case the reflection is unique. All finite dimensional flats are orthocomplemented, as are all intersections of finitely many mutually orthogonal orthocomplemented hyperplanes. All hyperplanes are orthocomplemented if and only if the geometry is finite dimensional. Many familiar results about reflections are generalized.

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EXTENSION OF SET THEORY TO THE THEORY OF SEMISETS

The theory of semisets is a new mathematical discipline extending the theory of sets in the sense that there are also some "imaginary objects" called semisets/see P.Vopénka Nice 1970/. We shall mention various methods of adding semisets to the theory of sets without violating the original theory so that in the new theory new results can be proved.

Štěpánek, Petr (Czechoslovakia)

SUBMODEL OF ULTRAPRODUCT MODEL, ITERATED ULTRAPRODUCT IN THE THEORY OF SEMISETS

Models of the set theory, given by iterating ultrapower construction were studied in recent years. These models of the set theory are isomorphic to some special submodels of ultraproduct model over a proper class Boolean algebra. Description of these submodels will be given in the case of iterations over a proper class.

Using proper definition of classes in these models, one can show