# ON THE METRIZATION PROBLEM AND RELATED PROBLEMS IN THE THEORY OF ABSTRACT SETS*

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1. *Topological Space.* In the theory of abstract sets we assume that we are given an arbitrary aggregate $P$ and a relation between subsets of $P$ which corresponds to the relation between a set and its derived set in the classical theory of sets of points.† That is, the mathematical concept abstract set in its current sense includes the notion limit point or point of accumulation. The introduction of limit points permits the definition of continuous 1-1 correspondence or homeomorphy. The study of such correspondences, particularly of invariants under homeomorphic transformations, constitutes the science of topology or analysis situs.‡ It seems proper therefore to speak of an abstract set as a topological space.§ Throughout this paper, the term *topological space* or *abstract set* refers to any system of the form $(P, K)$ composed of an aggregate $P$ and a relation of the form $EKE'$ between the subsets $E$, $E'$ of $P$ which is subject to the condition, for every subset $E$ of the aggregate $P$ there is a unique set $E'$ in the relation $K$ to $E$. That is, the relation $K$ defines a single-valued set-valued function on the class $U$ of all subsets of the aggregate $P$.‖

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† See M. Fréchet, *Esquisse d'une théorie des ensembles abstraits*, Sir Asutosh Mookerjee's Commemoration volumes, II, p. 360, The Baptist Mission Press, Calcutta, 1922; *Sur les ensembles abstraits*, Annales de l'Ecole Normale, vol. 38 (1921), p. 341ff.

‡ See H. Tietze, *Beiträge zur allgemeinen Topologie*, I., Mathematische Annalen, vol. 88 (1923), p. 290.

§ This terminology is suggested by Fréchet. See Comptes Rendus, vol. 180 (1925), p. 419.

‖ These functions are studied in detail in an unpublished article by the writer.