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Jinlu Li* (jli@shawnee.edu), Department of Mathematics, Shawnee State University, Portsmouth, OH 45662. *Set Optimization Problems on Ordered Sets and Applications*. Preliminary report.

The results in this talk mainly come from two joint papers by the speaker and Professor Christiane Tammer. In this talk, we define and construct some ordering relations on the power sets of ordered sets, which provides rules for ordering subsets. On the power sets of preordered sets, we introduce three preordering relations based on the given preorder relations, which are called the power preorder, upward power preorder and downward power preorder, respectively. (a) Several properties of these three preordering relations are provided; (b) We consider the order-clusters with respect to these preorders on the power sets, introduce the concepts of order-clustered fixed point and prove some order-clustered fixed point theorems; (c) We consider optimization problems of set-valued mappings on ordered sets; (d) Under these preordering relations, by applying the order-clustered fixed point theorems, we prove some existence theorems of generalized Nash equilibriums for set-valued mappings; (e) We prove the solvability of generalized variational inequality problems with set-valued mappings; (f) Efficiencies and Pareto efficiencies of set-valued mappings are defined and their solvability is investigated. (Received August 26, 2019)