(WEAK) PRECOMPACTNESS AND LOCAL (WEAK) PRECOMPACTNESS IN PREUNIFORM CONVERGENCE SPACES.

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ABSTRACT. In this article, we introduce and study (weak) precompactness and local (weak) precompactness within the construct of preuniform convergence spaces and uniformly continuous maps. In this construct, the concepts of (weak) compactness and local (weak) compactness were previously investigated by Preuß (2010). We provide a comprehensive implication scheme between all beforementioned concepts of compactness in the realm of preuniform convergence spaces. We also establish the relationship between the concept of (weak) precompactness when applied to quasiuniform spaces and existing concepts for quasiuniform spaces, such as totally boundedness and Cauchy-boundedness. We prove Tychonoffs theorem with respect to (weakly) precompact and locally (weakly) precompact preuniform convergence spaces. Moreover, it turns out that the construct of all locally precompact preuniform convergence spaces (and uniformly continuous maps) is a topological universe. Finally, we prove that one needs not to distinguish between locally (weakly) compact and (weakly) compactly generated resp. locally (weakly) precompact and (weakly) precompactly generated preuniform convergence spaces. Our findings can be considered as generalizations of known theorems in the realm of quasiuniform spaces and semiuniform convergences spaces.