ITES2007 Sixth Italian-Spanish conference
on General Topology and applications
Bressanone, 26-29 June 2007

Uniform Type Hyperspaces

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If (X, Q) is a quasi-uniform space authors as Künzi, Romaguera, Berthiaume had defined the Bourbaki quasi-uniformity, Q^* on $P_0(X)$, the set of all non-empty subsets at X. However if (X, Q) is a local quasi-uniformity we show with an example that Q^* may not be a local quasi-uniformity in $P_0(X)$.

If X is equipped with an algebraic structure (semigroup, monoid, group, conoid) and its operations are uniformly continuous with respect to Q, we will prove that the corresponding algebraic structure in $P_0(X)$ or $P_{conv}(X)$ (the set of all non-empty convex subsets of X) has the same continuity properties with respect to Q^*.

We make special emphasis in the case that $(X, +, m, Q)$ is a quasi-uniform conoid. We see that when $(X, +, m, Q)$ is a quasi-uniform locally balanced or convex conoid, then $(P_{conv}(X), +, m, Q^*)$ is a quasi-uniform locally balanced or convex conoid.

We say that the external operation m is:

- (UC_a) if m_a is Q-uniformly continuous, for each positive real number a.
- $(C_{x,0})$ if m_x is $(e, t_Q)-$continuous at 0, for each x in X.
- (C_x) if m_x is (e, t_Q)-continuous.

We will prove for instance that:

- If m satisfy the (UC_a) property, then m is also (UC_a) in $(P_{conv}(X), +, m, Q^*)$.
- If (X, Q) is precompact m satisfy the $C_{x,0}$ property, then m is also $C_{K,0}$ in $(P_{conv}(X), +, m, Q^*)$.
- If (X, Q) is a precompact uniform space and if m satisfy the C_x and (UC_a) property, then m is also C_K in $(P_{conv}(X), +, m, Q^*)$.

(This communication has two co-authors: Eusebio Corbacho, Vigo University, Spain, and Vaja Tarieladze, Institute of Computational Mathematics, Georgian Academy of Sciences, Georgia.)