Hyper-continuous convergence in function spaces: Part II

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Abstract

Continuous convergence was first studied by Du Bois-Reymond in 1886-1887 and then by Hahn in 1921 for real-valued functions. Kuratowski worked on the subject in 1947 for functions on metric spaces. Arens and Dugundji extended it to functions on topological spaces in 1951. The beautiful result of Kuratowski states:

Let (X, d) be metric spaces, $f_n, f \in C(X, Y)$ and let X be compact. Then the sequence f_n *converges uniformly to* $f \Leftrightarrow f_n$ *converges continuously to* f (i.e. for all sequences $x_n \to x$ in $X \Rightarrow f_n(x_n) \to f(x)$ in Y).

In the previous paper, restricting ourselves to metric spaces we generalized the Du Bois-Reymond-Hahn-Kuratowski result to Hausdorff hyper-convergence by replacing points by sets equipped with Hausdorff metric. In this second part, we continue our work with other hyperspace topologies such as Vietoris, proximal, Fell.