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## NINTH WINTER SCHOOL ON ABSTRACT ANALYSIS (1981)

### Cartesian closed hull of uniform spaces

Jiří Adámek and Jan Reiterman

Praha

A concrete category is called cartesian closed topological CCT if it is initially complete, fibre small and has canonical hom-objects. The CCT-hull of a concrete category, introduced by H. Herrlich and L.D. Nel, is the least CCT category in which the original category is a concrete, full, finitely productive subcategory.

Definition. A bornology on a set  $X$  is a collection  $\mathcal{B}$  of its subsets (called bounded subsets) such that (i) each finite subset is in  $\mathcal{B}$ , (ii) if  $B_1, B_2 \in \mathcal{B}$  then  $B_1 \cup B_2 \in \mathcal{B}$ , (iii)  $B \in \mathcal{B}$  implies  $B' \in \mathcal{B}$  for all  $B' \subset B$ . A bornological uniform space is a triple  $(X, \mathcal{U}, \mathcal{B})$  where  $(X, \mathcal{U})$  is a uniform space,  $\mathcal{B}$  is a bornology on  $X$  such that each set  $A \subset X$  with the property

"for every cover  $\alpha \in \mathcal{U}$  there is  $B \in \mathcal{B}$  with  $A \subset \text{st}_\alpha B$ " is in  $\mathcal{B}$ . Morphisms  $f : (X, \mathcal{U}, \mathcal{B}) \rightarrow (Y, \mathcal{V}, \mathcal{C})$  of bornological spaces are those maps  $f : X \rightarrow Y$  which preserve bonded sets and are uniformly continuous on bounded sets. Each uniform space is regarded as a bornological uniform space with bornology consisting of all subsets.

Theorem. The CCT-hull of the category  $\text{Unif}$  of uniform spaces is the category  $\text{Bunif}$  of bornological uniform spaces.