

## **Marczewski-Burstin representations algebras and ideals of sets**

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E. Marczewski in 1936 introduced the  $\sigma$ -algebra of  $(s)$ -sets and the sigma-ideal of  $(s_0)$ -sets in a Polish space as the results of operations  $S$  and  $S_0$  on the family of all perfect sets. Earlier, in 1914, C. Burstin used these operations implicitly to characterize the sigma-algebra of Lebesgue measurable sets and the ideal of Lebesgue null sets on the real line. If  $S$  and  $S_0$  are applied to a nonempty family of nonempty sets, they always produce an algebra and an ideal of sets. We give several results showing that various pairs of type (an algebra, an ideal) are representable in the form  $(S(\mathcal{F}), S_0(\mathcal{F}))$ ; we call it an MB-representation. For the sigma-algebra of all Borel subsets of the real line, the respective result concerning MB-representation has been proved while two stages of GCH are assumed. It is not known whether this remains true within ZFC. Other interesting questions connected with MB-representations are open. This theory has been developed thanks to works of J. Brown, P. Reardon, K. Ciesielski, S. Baldwin, A. Bartoszewicz, S. Wroński and others.