

Bernstein sets don't give Vitali sets

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We report on a joint project with Mariam Beriashvili. Building upon an insight of Yu Liang we produce a model of $ZF + DC$ in which there are Bernstein sets, Luzin sets, and Sierpiński sets, but there is no Vitali set and hence no Hamel basis.

We also present Feferman's result according to which the existence of Vitali sets doesn't imply that there be a well-ordering of the reals. It is open if the existence of a Hamel basis implies that there be a well-ordering of the reals.