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Symmetric Porosity and Symmetric Cantor Sets

This talk consisted of two parts. The first part focused on demonstrating that the σ–symmetrically porous sets are in a very real sense significantly smaller than the σ–porous sets. The second part focused on examples of some theorems whose exceptional sets are σ–porous, but not σ–symmetrically porous.

The first part is based on a joint work with Paul Humke and Karen Saxe [1], which appears later in this issue of the Exchange. One may consult it for definitions and formal statement of results. Two things shown there are 1) the existence of a bilaterally strongly porous set which is not σ–symmetrically porous; and 2) the existence of a symmetrically porous set S and a number $0 < c < 1$ such that S cannot be written as a countable union of sets, each having porosity at least c at each of its points. (Also see [2] for an independent proofs of analogous results.) This latter property is in contrast to the situation for σ–porous sets (e.g. see [4]). Symmetric Cantor sets play a key role in both examples and symmetric porosity properties of such sets are investigated in considerable detail in [1].

As an example of the type of theorem considered in the second part of the talk, consider the result of L. Zajíček [3] which states that for an arbitrary function the set of points where the left and right essential cluster sets differ is a σ–porous set. We observe that the exceptional set in that theorem need not be a σ–symmetrically porous set, even if f is a fairly nice function. The construction of such a function which demonstrates this type behavior as well as examples relating to other theorems (most dealing with derivative and derivate behavior) having σ–porous exceptional sets which are not σ–symmetrically porous are contained in a paper in preparation by the speaker.

References

[1] M. J. Evans, P. D. Humke, and K. Saxe, A symmetric porosity conjecture of L. Zajíček, *Real Anal. Exch.* (this issue).

[2] M. Repický, An example which discerns porosity and symmetric porosity, *Real Anal. Exch.* (this issue).

[3] L. Zajíček, On cluster sets of arbitrary functions, *Fund. Math.* 83 (1974), 197–217.

[4] L. Zajíček, Porosity and σ–porosity, *Real Anal. Exch.* 13 (1987–88), 314–350.