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Sierpiński set of Euclidean plane

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A subset S of \mathbb{R}^2 is called a *Sierpiński set* of the plane, if every line parallel to the x -axis intersects S only in countably many points and every line parallel to the y -axis avoids S in only countably many points:

$$\{x \in \mathbb{R} : (x, y) \in S\} \text{ is countable for all } y \in \mathbb{R}$$

$$\{y \in \mathbb{R} : (x, y) \notin S\} \text{ is countable for all } x \in \mathbb{R}$$

The existence of Sierpiński sets is <http://planetmath.org/Equivalent3equivalent> with the continuum hypothesis, as is proved in [1].

References

- [1] GERALD KUBA: “Wie plausibel ist die Kontinuumshypothese?”. – *Elemente der Mathematik* **61** (2006).