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A continuous movement version of the Banach-Tarski paradox: a solution to de Groot's problem. (English) [Zbl 1134.03028](#)

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Summary: In 1924 Banach and Tarski demonstrated the existence of a paradoxical decomposition of the 3-ball B , i.e., a piecewise isometry from B onto two copies of B . This article answers a question of de Groot from 1958 [see *S. Wagon*, *The Banach-Tarski paradox*. Cambridge etc.: Cambridge University Press (1985; [Zbl 0569.43001](#))] by showing that there is a paradoxical decomposition of B in which the pieces move continuously while remaining disjoint to yield two copies of B . More generally, we show that if $n \geq 2$, any two bounded sets in \mathbb{R}^n that are equidecomposable with proper isometries are continuously equidecomposable in this sense.

MSC:

[03E25](#) Axiom of choice and related propositions

[28E15](#) Other connections with logic and set theory

Full Text: [DOI](#)

References:

- [1] The Banach-Tarski paradox 24 (1985)
- [2] *Rendiconti dell'Istituto di Matematica dell'Università di Trieste* 23 pp 145– (1991)
- [3] DOI: [10.1073/pnas.89.22.10726](#) · [Zbl 0768.04002](#) · doi:[10.1073/pnas.89.22.10726](#)
- [4] *Classical descriptive set theory* 156 (1995) · [Zbl 0819.04002](#)
- [5] *Journal für die Reine und Angewandte Mathematik* 404 pp 77– (1990)

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