

## Slices through four-dimensional fractals

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Regular polytopes serve as building stones for fractal constructions, think of the fractal  $n$ -gons in 2 dimensions or self-similar sets arising from the platonic solids like Sierpinski's pyramid. In four-dimensional space exist six regular polytopes. Beside constructions generalizing the five solids in three dimensions there exists a self-dual 24-cell. We will present several fractal constructions based on the 24-cell and other regular polyhedra in four dimensions.

Fractal constructions in four dimensions cannot be illustrated but we can visualise their three-dimensional intersections with hyperplanes. We call such an intersection a slice. To illustrate slices we were using the cutting plane method. This method can be applied to a class of self-similar sets generated by homotheties with scaling factor an inverse of a Pisot unit  $\beta$  and translations in  $\mathbb{Q}(\beta)^n$ . From the algebraic point of view our method generalises a result on  $\beta$ -representations stated by Schmidt in 1979.

