

## CORRUGATIONS AND $C^1$ -FRACTALITY

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**Key words:** differential geometry, convex integration, isometries.

**Abstract:** Convex Integration is a general method developed by Mikhaïl Gromov to solve differential relations. It has been used in 2012 to produce the first images of an isometric embedding of the flat torus into the 3-dimensional Euclidean space. These images reveal a geometric structure that is simultaneously  $C^1$  and fractal. In this talk, we address the general question of the appearance of the  $C^1$ -fractality in the solutions built by Convex Integration. To do so, we first define the notion of Kuiper differential relations. We then show that such relations allow the emergence of a  $C^1$  fractal behavior. We illustrate this point by considering totally real isometric maps: we first state a  $C^1$  isometric embedding theorem "à la Nash-Kuiper" and then show that totally real isometric maps obtained by Convex Integration have  $C^1$ -fractal properties.