

Topological Data Analysis combined with Machine Learning for Predicting Permeability of Porous Media

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LIST OF SUPPLEMENTARY FILES:

a. Video 1: Evolution of the α -complex as α increases, showing the formation and disappearance of connected components (H0) and loops (H1). Circles of a particular radius α are drawn around each point in the point cloud. Edges are formed when two circles overlap, and when at least three circles overlap at a common point, loops appear.

b. Video 2: Superlevel filtration of the Euclidean Distance Transform (EDT) shown in 2D, 3D, and top views. As the threshold decreases, high-distance regions (deep voids) first appear as isolated components (H0), which grow and merge to form connected structures and eventually loops (H1). The animation highlights the birth, merging, and persistence of topological features.