

Part III

Homology

Gently shifting from geometry to topology, we introduce simplicial complexes as a general representation of shapes and spaces. The transition comes with an increased emphasis on connectivity. Contrary to a widely held belief, this does not imply that topology is not useful to distinguish intricate shapes with simple global connectivity, such as human faces and root systems of plants. Evidence to support this claim will be given in the next part, whose topic is persistent homology. This part focuses on the homology of individual topological spaces, which is a classic topic in algebraic topology.