

Title: On first-order topological queries

Authors: Martin Grohe and Luc Segoufin

Abstract:

One important class of spatial database queries is the class of topological queries, i.e. queries invariant under homeomorphisms.

We study topological queries expressible in the standard query language on spatial databases, first-order logic with various amounts of arithmetic. Our main technical result is a combinatorial characterization of the expressive power of topological first-order logic on regular spatial databases.

We use this result to answer questions of (Segoufin, Vianu 1998), (Kuijpers, Paredaens, van den Bussche 1997) and (Kuijpers, van den Bussche 1999), respectively.