Abstract

In the usual set-based presentation of mathematics, mathematical spaces of all types are introduced as sets endowed with extra-structures, and the elements of these underlying sets are called the points of the spaces they define.

This presentation is problematic, especially in relation with computer science where everything has to be constructive, and also because we never see points in the physical world.

The talk will begin with an examination of the notion of real number.

This will naturally lead to the definition - due to Grothendieck - of a geometry which is not "point-based" in the sense that spaces are no more defined in terms of points and can even have no points at all.

The definition of this new geometry makes topology much more general and relates it to logic through a notion of point which becomes a well-defined derived concept attached to spaces and is amenable to computations.