Topological aspects of Boolean functions

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A Boolean function is an arbitrary function from {0,1}^n to {0,1}. It is known that most Boolean functions are enormously difficult to specify, but efforts to find infinite families of Boolean functions with asymptotically maximal complexity (measured, say, by formula length) have not succeeded. I will suggest several attempts to construct topological spaces from Boolean functions for which one might hope that the complexity of the topology reflects the complexity of the Boolean function.