Department of Mathematics,
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Zoom for Thought

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Topological Quantum Computation: The Toric Code

Abstract:

One of the largest problems in Quantum Computation is how you deal with errors. Alexei Kitaev invented a method whereby we can use the discretization of a manifold to encode logical information in a subspace of the Hilbert space that corresponds to the homology of the Manifold itself. This has been vastly generalized, but we will restrict to looking at his original example of the toric code. We will go through how it can be used as an error-correcting code and several methods on how to actually compute on such a code. If time permits we can discuss recent results where expander graphs (and in general combinatorial methods) are used to construct a very good code which is then used to construct a manifold that solves a certain problem in differential topology.

Tuesday, February 2, 2021
2:00 PM
Please see email with subject "Zoom for Thought Information"

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