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What Chern-Simons theory assigns to a point ?

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According to the cobordism hypothesis (proposed by Baez-Dolan, and proved by Lurie), an extended topological quantum field theory is fully determined by its value on the point. A natural question is then: does this classification theorem apply to the topological quantum field theories of physical interest? And if yes, what is then the value of those theories on a point (the latter will then determine the whole theory, by the cobordism hypothesis). In this talk, we will propose answers to the questions “What does Chern-Simons theory assign to a point?” and “What kind of mathematical object does Chern-Simons theory assign to a point?” The answer to the first question is “representations of the based loop group”; the answer to the second question is “categorified von Neumann algebras”.

Summary

Presenter: HENRIQUES, André (Oxford and Utrecht University)

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