

CHARACTER THEORY AND CATEGORIFICATION

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Abstract: Over a hundred years after the work of Frobenius and Schur, the sheer enormity of what is *not known* about the character theory of symmetric and alternating groups continues to surprise and awe the uninitiated. How does one decompose the tensor product of a pair of complex characters? Or the restriction of a complex character to a Sylow or wreath product subgroup? Can we understand the vanishing sets of complex characters? What about the asymptotic behaviour of complex characters? What are the dimensions of the modular characters? These questions have been hailed as some of the definitive open problems in representation theory and algebraic combinatorics, they have deep connections with Lie theory, group theory, local-global conjectures in representation theory of finite groups, symplectic geometry, complexity theory, statistical mechanics and quantum information theory.

The overarching theme of this proposal is the use of hidden, richer representation theoretic structures arising in modular, local-global, and categorical representation theory in order to prove and disprove conjectures concerning characters of symmetric and alternating groups.

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