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The regular representation of S_n in interference of fermions and bosons

Using tools from group representation theory, I will discuss the coincidence rate of partially-distinguishable particles in an interferometry experiment. In an experiment with n particles (fermions or bosons) the expressions contain blocks of terms for each partition of n ; Gamas's theorem is used to determine which of these terms are automatically zero based on the pairwise level of distinguishability between particles. The computational complexity of the associated group function is introduced to show that, if the known algorithms are used, the problem of evaluating fermionic coincidence rates will contain, with probably close to 1, some functions with cost exponential in n .

This work was done in collaboration with:

- Dylan Spivak, Department of Mathematical Sciences, Lakehead University,
- Murphy Yuezhen Niu, Department of Physics, MIT
- Barry C. Sanders, Institute for Quantum Science and Technology, University of Calgary