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The combinatorial game NOFIL played on Steiner triple systems

We define the impartial combinatorial game NOFIL played on designs. We review some relevant combinatorial game theory. We discuss what is known about optimal play on small Steiner triple systems, exhaustively up to order 15 and for sampled STSs of orders 19, 21 and 25. We show that the complexity of determining the outcome of a game of NOFIL (possibly with moves already made) on Steiner triple systems is PSPACE-complete by reducing the combinatorial game NODE KAYLES on graphs to NOFIL using Barber et al.'s existence theorem of triangle decompositions for sufficiently large triple-divisible graphs. This is joint work with Drs. M. Huggan and S. Huntemann.