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Parity of MOLS

The useful notion of parity of permutations can be extended to Latin squares. Each Latin square has a row, column and symbol parity, but any two of these determines the third. We consider a direct generalization of the parity of a Latin square to the parity of a set of mutually orthogonal Latin squares (MOLS) and present some constraints on parity which are strictest in the case of MOLS corresponding to projective planes. Projective planes of order $n \equiv 2 \pmod{4}$, $n > 2$, are widely believed not to exist; our results give some insight as to why it is harder to build projective planes in this case.