A Class of Bicyclic Antiautomorphisms of Mendelsohn Triple Systems

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A cyclic triple, \((a, b, c)\), is defined to be the set \(\{(a, b), (b, c), (c, a)\}\) of ordered pairs. A Mendelsohn triple system of order \(v\), \(\text{MTS}(v)\), is a pair \((M, \beta)\), where \(M\) is a set of \(v\) points and \(\beta\) is a collection of cyclic triples of pairwise distinct points of \(M\) such that any ordered pair of distinct points of \(M\) is contained in precisely one cyclic triple of \(\beta\). An antiautomorphism of a Mendelsohn triple system, \((M, \beta)\), is a permutation of \(M\) which maps \(\beta\) to \(\beta^{-1}\), where 

\[
\beta^{-1} = \{(c, b, a) | (a, b, c) \in \beta\}.
\]

Necessary conditions for the existence of a Mendelsohn triple system of order \(v\) admitting an antiautomorphism consisting of two cycles of lengths \(M\) and \(N\), where \(N > 2M\) have been shown, and in some cases, sufficiency has been shown. We show sufficiency for the case \(M \equiv 1 \pmod{24}\) with \(N = 6M\).

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