Some 1,M,N-Antiautomorphisms of Directed Triple Systems

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A transitive triple, \((a, b, c)\), is defined to be the set \(\{(a, b), (b, c), (a, c)\}\) of ordered pairs. A directed triple system of order \(v\), \(DTS(v)\), is a pair \((D, \beta)\), where \(D\) is a set of \(v\) points and \(\beta\) is a collection of transitive triples of pairwise distinct points of \(D\) such that any ordered pair of distinct points of \(D\) is contained in precisely one transitive triple of \(\beta\). An antiautomorphism of a directed triple system, \((D, \beta)\), is a permutation of \(D\) which maps \(\beta\) to \(\beta^{-1}\), where \(\beta^{-1} = \{(c, b, a) | (a, b, c) \in \beta\}\). Necessary conditions for the existence of a directed triple system of order \(v\) admitting an antiautomorphism consisting of three cycles of lengths 1, \(M\), and \(N\), where \(N > 2M\) are known, and in some cases, sufficiency has been shown. In this paper we show sufficiency for some previously unsolved cases.

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