A Particular Class of $1, M, N$-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 $\beta^{-1} = \{(c, b, a) | (a, b, c) \in \beta\}$. In this paper we give sufficient 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 $M \equiv 8 \pmod{24}$ and $N > 2M$.

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