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Matroid 4-Connectivity: A Deletion-Contraction Theorem

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Abstract A 3-separation (A, B), in a matroid M, is called *sequential* if the elements of A can be ordered $(a_1, \ldots, a_k)$ such that, for $i = 3, \ldots, k$, $(\{a_{i+1}, \ldots, a_k\} \cup B)$ is a 3-separation. A matroid M is *sequentially* 4-*connected* if, for every 3-separation (A, B) or M, either (A, B) or (B, A) is sequential. We prove that, if M is sequentially 4-connected matroid that is neither a wheel nor a whirl, then there exists an element x of M such that either $M\backslash x$ or M/x is sequentially 4-connected.