1037-05-128 **Jim Geelen** and **Xiangqian Zhou*** (x.zhou@marshall.edu), Department of Mathematics, Marshall University, One John Marshall Drive, Huntington, WV 25755. *Inductions for "4-connected" Graphs and Matroids.*

Tutte (1966) proved that for every 3-connected matroid M with $|E(M)| \geq 4$, if M is not a wheel or a whirl, then there exists an element e such that either $M\backslash e$ or M/e is 3-connected. Seymour (1980) proved a stronger theorem: let N be a 3-connected minor of a 3-connected matroid M with $|E(N)| \geq 4$. If M is not a wheel or a whirl, then there exists $e \in E(M)$ such that either $M\backslash e$ or M/e is 3-connected and has an N-minor. The above two theorems provide an important inductive tool for proving theorems about 3-connected matroids.

In structural graph and matroid theory, one often needs to study graphs or matroids with higher connectivity, for example, it is known that every binary matroid can be built from its internally 4-connected minors by three types of summing operations. We prove an analogue of Tutte's Theorem for weakly 4-connected matroid and an analogue of Seymour's Theorem for internally 4-connected binary matroids. This is joint work with Jim Geelen. (Received January 29, 2008)