Induction for "4-connected" Matroids and Graphs

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A matroid M is a pair $(E, \mathcal{I})$ where E is a finite set, called the *ground set* of M, and $\mathcal{I}$ is a non-empty collection of subsets of E, called *independent sets* of M, such that (1) a subset of an independent set is independent; and (2) if I and J are independent sets with $|I| < |J|$, then exists $x \in J \backslash I$ such that $I \cup \{x\}$ is independent.

A graph G gives rise to a matroid $M(G)$ where the ground set is $E(G)$ and a subset of $E(G)$ is independent if it spans a forest. Another example is a matroid that comes from a matrix over a field F: the ground set E is the set of all columns and a subset of E is independent if it is linearly independent over F.

Tutte's Wheel and Whirl Theorem and Seymour's Splitter Theorem are two well-known inductive tools for proving results for 3-connected graphs and matroids. In this talk, we will give a survey on induction theorems for various versions of matroid 4-connectivity.