Generating graphs with a specific minor

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Suppose that $G$ is a simple 3-connected graph with a simple 3-connected minor $H$. The Splitter Theorem (Seymour 1980) states that, if $G$ is not a wheel and $H$ is not a 3-wheel, then up to isomorphism $G$ can be obtained from $H$ by a sequence of operations that consist of adding an edge between non-adjacent vertices or splitting a vertex. The Strong Splitter Theorem (KINGAN and LEMOS 2014) optimizes the Splitter Theorem to best possible by showing that at most two edges may be added before a vertex must be split, unless $G$ and $H$ have the same number of vertices. We say that $G$ is $H$-critical if removal of any edge either destroys 3-connectivity or the $H$-minor. Such graphs are useful because they are just barely outside the class of graphs with no $H$-minor. We present results on $H$-critical graphs and a method for generating them.