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Guoli Ding and **Jinko Kanno*** (jkanno@latech.edu), Program of Math and Statistics,
Louisiana Tech University, Ruston, LA 71272. *Splitter Theorems for 4-regular Planar Graphs.*

Let $\Phi_{k,g}$ be the class of k -edge connected 4-regular graphs with girth of at least g , and let $\mathcal{P}\Phi_{k,g}$ be the subclass of all plane graphs in $\Phi_{k,g}$. For several choices of k and g , we determine a set $\mathcal{O}_{k,g}$ of graph operations in the plane, for which, if G is a graph in $\mathcal{P}\Phi_{k,g}$, contains a graph H of $\Phi_{k,g}$ as an immersion and is not isomorphic to a pinched graph H^P which is obtained from a drawing of H by replacing each crossing point with a vertex, then some operation in $\mathcal{O}_{k,g}$ can be applied to G to result in a smaller graph G' in $\mathcal{P}\Phi_{k,g}$ such that, on one hand, G' is immersed in G , and on the other hand, G' contains H as an immersion. Here, reducing to pinched graphs is the best possible if we allow a finite number of graph operations. (Received September 12, 2006)