# ON LONGEST CYCLES IN ESSENTIALLY 4-CONNECTED PLANAR GRAPHS 

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#### Abstract

A planar 3 -connected graph $G$ is essentially 4 -connected if, for any 3separator $S$ of $G$, one component of the graph obtained from $G$ by removing $S$ is a single vertex. Jackson and Wormald proved that an essentially 4connected planar graph on $n$ vertices contains a cycle $C$ such that $|V(C)| \geq$ $\frac{2 n+4}{5}$. For a cubic essentially 4 -connected planar graph $G$, Grünbaum with Malkevitch, and Zhang showed that $G$ has a cycle on at least $\frac{3}{4} n$ vertices. In the present paper the result of Jackson and Wormald is improved. Moreover, new lower bounds on the length of a longest cycle of $G$ are presented if $G$ is an essentially 4 -connected planar graph of maximum degree 4 or $G$ is an essentially 4-connected maximal planar graph.


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