N-flips in 5-chromatic even triangulations on the projective plane

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A triangulation $G$ on a closed surface $F^2$ is a simple graph embedded on $F^2$ such that each face of $G$ is triangular. A triangulation is even if each vertex has even degree. For an even triangulation, we define two local transformations, called an $N$-flip and a $P_2$-flip, which transform an even triangulation into an even triangulation. Through the two operations do not always preserve the chromatic number of even triangulations, we prove that any two 5-chromatic even triangulations $T$ and $T'$ on the projective plane with $|V(T)| = |V(T')| \geq 17$ can be transformed into each other by the two operations preserving the chromatic number and the simpleness of graphs.

Keywords: even triangulation, $N$-flip, chromatic number, projective plane