The cycle structure for directed graphs on surfaces.


Summary: In this paper, the cycle structures for directed graphs on surfaces are studied. If $G$ is a strongly connected graph, $C$ is a $\Pi$-contractible directed cycle of $G$, then both of Int$(C, \Pi)$ and Ext$(C, \Pi)$ are strongly connected graph; the dimension of the cycles space of $G$ is identified. If $G$ is a strongly connected graph, then the structure of MCB in $G$ is unique. Let $G$ be a strongly connected graph, if $G$ has been embedded in orientable surface $S_g$ with $f_w(G) \geq 2$ ($f_w(G)$ is the face-width of $G$), then any cycle base of $G$ must contain at least $2g$ noncontractible directed cycles; if $G$ has been embedded in non-orientable surface $N_g$, then any cycle base of $G$ must contain at least $g$ noncontractible directed cycles.

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