INTRODUCTION TO THE MCPHERSON NUMBER, $\Upsilon(G)$ OF A SIMPLE CONNECTED GRAPH

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Abstract

The concept of the McPherson number of a simple connected graph G on n vertices denoted by $\Upsilon(G)$, is introduced. The recursive concept, called the McPherson recursion, is a series of vertex explosions such that on the first iteration a vertex $v \in V(G)$ explodes to arc (directed edges) to all vertices $u \in V(G)$ for which the edge $vu \notin E(G)$, to obtain the mixed graph G_1'. Now G_1' is considered on the second iteration and a vertex $w \in V(G_1') = V(G)$ may explode to arc to all vertices $z \in V(G_1')$ if edge $wz \notin E(G)$ and arc (w, z) or $(z, w) \notin E(G_1')$. The McPherson number of a simple connected graph G is the minimum number of iterative vertex explosions say ℓ, to obtain the mixed graph G_ℓ' such that the underlying graph of G_ℓ' denoted G_ℓ^* has $G_\ell^* \simeq K_n$. We determine the McPherson number for paths, cycles and n-partite graphs. We also determine the McPherson number of the finite Jaco Graph $J_n(1)$, $n \in \mathbb{N}$. It is hoped that this paper will encourage further exploratory research.