

Special asteroidal quadruple on directed path graph non rooted path graph.

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Abstract. An *asteroidal triple* in a graph G is a set of three non-adjacent vertices such that for any two of them there exists a path between them that does not intersect the neighborhood of the third. Special asteroidal triple in a graph G is an asteroidal triple such that each pair is linked by a special connection. A special asteroidal triples play a central role in a characterization of directed path graphs by Cameron, Hoáng and Lévêque [2]. They also introduce a related notion of asteroidal quadruple and conjecture a characterization of rooted path graphs [1]. In its original form this conjecture is not complete, still in leafage four, as was showed in [3]. But, as suggested by the conjecture, a characterization by forbidding particular types of asteroidal quadruples may hold. We prove that the conjecture in the original form is true on directed path graphs with leafage four having two minimal separators with multiplicity two. Thus we build the family of forbidden subgraphs in this case.

References

1. K. Cameron, C. T. Hoáng, B. Lévêque. Asteroids in rooted and directed path graphs. *Electronic Notes in Discrete Mathematics* 32 (2009) 67-74.
2. K. Cameron, C. T. Hoáng, B. Lévêque. Characterizing directed path graphs by forbidden asteroids. *Journal of Graph Theory* 68 (2011) 103–112.
3. M. Gutierrez, B. Lévêque, S. B. Tondato, Asteroidal quadruples in non rooted path graphs, manuscript 2012.