Title: Characterization of 2-path unit probe interval graphs

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Abstract: Recently 2-trees that are probe interval graphs have been characterized, and a natural next step is to characterize 2-trees that are unit probe interval graphs. To do this, one needs generalizations of paths and caterpillars to 2-trees that are called 2-paths and 2-caterpillars, and then a special class of 2-caterpillars called interior 2-caterpillars. A 2-path is an alternating sequence of distinct 2 and 3-cliques, $(e_o, t_1, e_1, t_2, e_2, t_p, ..., e_p)$, starting and ending with a 2-clique and such that t_i contains exactly two distinct 2-cliques e_{i-1} and $e_i (0 < i < (p+1))$. A 2-leaf is a vertex whose neighborhood is a 2-clique. A 2-caterpillar P is a 2-tree in which the deletion of all 2-leaves results in a 2-path, called the body of P. A 2-caterpillar P is an interior 2-caterpillar if for some 2-leaf v, v is adjacent to any interior edge e_i of any longest 2-path of P. Recently it has been proved that a 2-tree Unit Probe Interval Graph is an interior 2-caterpillar. Interior 2-caterpillars can be thought of as 2-paths with 2-leaves on some of the interior edges. So when characterizing interior 2-caterpillars which are unit probe interval graphs the natural step is to characterize 2-paths which are unit probe interval graphs first. Once we have a complete characterization of the 2-path unit probe interval graphs, we can use that to derive a list of forbidden subgraphs for interior 2-caterpillars which are unit probe interval graphs. Hence in this paper we will give the complete list of forbidden subgraphs for 2-paths which are unit probe interval graphs. Later we use these results for subsequent work where we characterize 2-trees that are unit probe interval graphs.

Keywords: unit probe interval graphs, 2-path, 2-caterpillar