Spectral radius of rooted product of graphs

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The rooted product of a graph H by a sequence of rooted graphs G_i, $i \in V(H)$, is obtained by identifying the vertex i of H with the root of G_i. The rooted product of graphs was defined by Godsil and McKay [1], where they also determined its characteristic polynomial. Here we consider the special case when all rooted graphs are isomorphic either to a given rooted graph G or to a single-vertex graph (in other words, copies of G are attached to a subset of vertices of H only). We study the behavior of the principal eigenvector of such rooted product and resolve a 2009 conjecture by Belardo, Marzi and Simic on the spectral radius of rooted product of H with a sequence of stars of equal size.

References

[1] C.D. Godsil, B.D. McKay, A new graph product and its spectrum, Bull. Austral. Math. Soc. 18 (1978), 21–28.