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Jonathan L. Gross, Toufik Mansour, Thomas W. Tucker and David G.L. Wang*
(david.combin@gmail.com), Department of Mathematics, University of Haifa, 3498838 Haifa,
Israel. *Log-concavity of the genus polynomials of Ringel ladders.*

A Ringel ladder can be formed by a self-bar-amalgamation operation on a symmetric ladder, that is, by joining the root vertices on its end-rungs. The present authors have previously derived criteria under which linear chains of copies of one or more graphs have log-concave genus polynomials. Herein we establish Ringel ladders as the first significant non-linear infinite family of graphs known to have log-concave genus polynomials. We construct an algebraic representation of self-bar-amalgamation as a matrix operation, to be applied to a vector representation of the partitioned genus distribution of a symmetric ladder. Analysis of the resulting genus polynomial involves the use of Chebyshev polynomials. This paper continues our quest to affirm the quarter-century-old conjecture that all graphs have log-concave genus polynomials. (Received September 09, 2013)