1096-05-269 **Jonathan L Gross*** (gross@cs.columbia.edu), 458 Computer Science, New York, NY 10027, and **Toufik Mansour**, **Thomas W Tucker** and **David G.L. Wang**. *Log-Concavity of Combinations of Sequences and Applications to Genus Distributions.*

We formulate conditions on a set of log-concave sequences, under which any linear combination of those sequences is log-concave, and further, of conditions under which linear combinations of log-concave sequences that have been transformed by convolution are log-concave. These conditions involve relations on sequences called *synchronicity* and *ratio-dominance*, and a characterization of some bivariate sequences as *lexicographic*. We are motivated by the 25-year old conjecture that the genus distribution of every graph is log-concave. Although calculating genus distributions is NP-hard, they have been calculated explicitly for many graphs of tractable size, and the three conditions have been observed to occur in the *partitioned genus distributions* of all such graphs. They are used here to prove the log-concavity of the genus distributions of graphs constructed by iterative amalgamation of double-rooted graph fragments whose genus distributions adhere to these conditions, even though it is known that the genus polynomials of some such graphs have imaginary roots. A blend of topological and combinatorial arguments demonstrates that log-concavity is preserved through the iterations. (Received August 25, 2013)