1030-05-143 **Art M Duval**, **Caroline Klivans** and **Jeremy L Martin*** (jmartin@math.ku.edu), Department of Mathematics, 405 Snow Hall, 1460 Jayhawk Boulevard, Lawrence, KS 66045. *A simplicial matrix-tree theorem, I. General results.*

The classical matrix-tree theorem expresses the number $\tau(G)$ of spanning trees of a graph G in terms of its associated Laplacian matrix. Building on the work of Bolker, Kalai and Adin, we generalize the matrix-tree theorem from graphs to the wider setting of simplicial complexes. Having defined simplicial spanning trees appropriately, we obtain a simplicial version of the matrix-tree theorem that expresses an analogous invariant $\tau(\Delta)$ in terms of the simplicial Laplacian matrices of Δ, where Δ is any pure d-dimensional simplicial complex that has the homology type of a wedge of spheres. By assigning indeterminates to the faces of Δ, we establish a weighted version of the simplicial matrix-tree theorem, yielding more finely weighted enumerators for simplicial spanning trees (akin to the Cayley-Prüfer theorem enumerating spanning trees of the complete graph by degree sequence). The talk by A. Duval will examine some applications of these general results. (Received July 30, 2007)