1167-05-144 **Jonathan L. Gross** (gross@cs.columbia.edu) and **Toufik Mansour*** (tmansour@univ.haifa.ac.il), Haifa, Israel, and **Thomas W. Tucker** (ttucker@colgate.edu).

*Partial Duality for Ribbon Graphs, III: A Gray Code Algorithm for Enumeration.*

This is a third paper in a series about partially dualizing an embedded graph $G$ on an arbitrary edge-subset, as per Chmutov. Paper I introduces the partial-duality polynomial, which enumerates all the possible partial-duals of the graph $G$, according to their Euler-genus, which varies with the edge-subset on which to dualize. Ellis-Monaghan and Moffatt have expanded partial-duality to all the operators ("twualities") of the Wilson group. Paper II derives formulas for partial-twuality polynomials for several fundamental sequences of embedded graphs. Paper III presents an algorithm to calculate all the partial-twuality polynomials, which involves organizing the edge-subsets of $G$ into a hypercube and traversing that hypercube via a Gray code.

At each vertex of a ribbon graph, the cyclic order of incident edges can be written in two directions. A set comprising one such cycle at each vertex is called a uni-rotation system.

In this talk, (1) we show how to construct the bi-rotation system $\rho$ and the extended monodromy from a uni-rotation system supplied as input. (2) We describe how the Euler genus of a ribbon graph is calculated from the extended monodromy. (3) We see how the extended mondromy is updated at each step of the traversal along the Gray code. (Received March 04, 2021)