1067-90-806 **S. Thomas McCormick*** (tom.mccormick@sauder.ubc.ca), 253 Main Mall, Vancouver, BC V6T 1Z2, Canada, and **Maren Martens** and **Britta Peis**. *Primal-Dual Algorithms for Weighted Abstract Flow and Weighted Abstract Cut Packing.*

Two attractive frameworks for combinatorial optimization problems with guaranteed integer optimal solutions are Hoffman's Weighted Abstract Flow model that packs abstract paths with supermodular weights satisfying a crossing axiom into elements, and Hoffman's Lattice Polyhedron model. When the lattice in this model is a clutter, Hoffman shows that these two models are blocking duals of each other by showing that the Lattice Polyhedron model effectively reduces to packing "cuts" in an abstract network with supermodular weights.

We show that a common algorithmic framework based on the Primal-Dual algorithm gives the first polynomial combinatorial algorithm for both problems. In each case we relax the problem by a scalar parameter to create an unweighted restricted subproblem of the same class. We develop algorithms to solve these restricted subproblems, and show that the parameter and solutions always take integer values. Then we can apply a standard scaling technique to make the algorithms weakly polynomial. These algorithms generalize previous algorithms by McCormick for unweighted abstract flow, and by Frank for monotone abstract cut packing. (Received September 15, 2010)