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Alberto Del Pia* (delpia@wisc.edu), Wisconsin Institute for Discovery, 330 North Orchard Street, Madison, WI 53715. *Concave Integer Quadratic Programming with Totally Unimodular Matrices.*

We consider the problem of minimizing a separable concave quadratic function over the integral points in a polyhedron defined by a totally unimodular constraint matrix. This problem is NP-hard and it is equivalent to its continuous relaxation obtained by dropping the integrality constraint. The continuous problem admits a strongly polynomial-time approximation algorithm, provided that the number of variables that appear nonlinearly in the objective is fixed. In this paper we close the gap between the continuous and discrete version of the problem by giving an approximation algorithm for the discrete problem whose running time is strongly polynomial if the number of variables that appear nonlinearly in the objective is fixed. Our result in particular yields a strongly polynomial-time approximation algorithm for the integral minimum concave cost network flow problem with quadratic costs, provided that the number of nonlinear arc costs is fixed. (Received September 21, 2018)