1145-90-821 **Cunlu Zhou***, University of Notre Dame, Department of Mathematics, 255 Hurley Hall, Notre Dame, IN 46556, and **Leonid Faybusovich**, University of Notre Dame, Department of Mathematics, 255 Hurley Hall, Notre Dame, IN 46556. *Long-Step Path-Following Algorithm for Nonlinear Symmetric Problems with Applications to Quantum Entropy Optimization.*

We developed a long-step path-following algorithm for a class of symmetric programming problems with nonlinear convex objective functions. The theoretical framework is developed for functions compatible in the sense of Nesterov and Nemirovski with $-\ln\det$ barrier function. Complexity estimates similar to the case of a linear-quadratic objective function are established, which gives an upper bound for the total number of Newton steps. The theoretical scheme is implemented for a class of spectral objective functions which includes the case of quantum (von Neumann) entropy objective function, important from the point of view of applications. We explicitly compare our numerical results with the only known competitor. (Received September 15, 2018)

1