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Tianran Chen* (chentia1@msu.edu) and **Tien-Yien Li** (li@math.msu.edu). *Path tracking algorithms for homotopy continuation methods in weighted projective spaces.*

Solving systems of polynomial equations is an important problem in mathematics with a wide range of applications in many fields. The homotopy continuation method is a large class of reliable and efficient numerical methods for solving systems of polynomial equations. An essential component in the homotopy continuation method is the path tracking algorithm for tracking smooth paths of one real dimension. While existing path tracking algorithms works inside \mathbb{C}^n or the complex projective space $\mathbb{C}\mathbb{P}^n$, in this talk we generalize the path tracking algorithms to weighted projective spaces by exploring the Riemannian structure of its smooth part. Results from numerical experiments have shown that these algorithms can be useful for solving quasi-homogeneous systems of polynomial equations. (Received September 16, 2013)