1121-05-101   **Mingxian Zhong*** (`mz2325@columbia.edu`), 528 Riverside Drive, Apt 4A, New York, NY 10027.
Recent progress on three-coloring graphs without long induced paths.

We present a polynomial time algorithm that determines if an input graph containing no induced seven-vertex path is 3-colorable. This affirmatively answers a question posed by Randerath, Schiermeyer and Tewes in 2002. Our algorithm also solves the list-coloring version of the 3-coloring problem, where every vertex is assigned a list of colors that is a subset of $\{1, 2, 3\}$, and gives an explicit coloring if one exists.

Our second result is an algorithm that approximately color a 3-colorable graph that does not contain an induced path on t vertices, for an arbitrary but fixed t. Specifically, we propose an algorithm that, given a 3-colorable graph without an induced path on t vertices, computes a coloring with $\max\{5, 2\lceil\frac{t-1}{2}\rceil - 2\}$ many colors. (Received July 13, 2016)