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Michael A Burr* (mburr1@fordham.edu), 441 East Fordham Road, Mathematics Department, Fordham University, Bronx, NY 10458, and **Sung Woo Choi, Ben Galehouse and Chee K Yap.** *Isotopic Approximations of Singular Algebraic Curves.*

In practical situations, numerical algorithms are frequently used because they are fast and easy to implement. When confronted with singular inputs, however, such algorithms usually either fail to terminate or make arbitrary decisions at user defined accuracy. Both situations should be avoided if we desire the output of an algorithm to be correct. In singular situations, it is sometimes possible to use symbolic algorithms to study the behavior for the singular input; these algorithms, however, are typically much slower than their numerical counterparts.

One such problem is the isotopic curve approximation problem: given a polynomial $f \in \mathbb{Z}[X, Y]$ and a region of interest B_0 in the real plane, find a polygonal approximation to the variety $V(f)$ restricted to B_0 which is both close to the variety and has the same topology as the variety.

In this talk, I will present one of the first purely numerical algorithms that solves the curve approximation problem, and, therefore, is guaranteed to be topologically correct even in the presence of singularities. Even though the algorithm itself is numerical, the correctness result requires techniques from classical algebraic geometry. (Received September 22, 2010)