# Exact semidefinite representations for genus zero curves

Pablo A. Parrilo

`parrilo@mit.edu`

*Dept. of Electrical Engineering & Computer Science*
*Massachusetts Institute of Technology*
*77 Massachusetts Ave., Room 32D-726*
*Cambridge, MA 02139-4307*
*USA*

**Abstract**

The characterization of convex sets that admit an exact representation in terms of semidefinite programming constraints (perhaps with additional variables) is one of great interest in optimization. There have been a few recents results in this direction, based mainly on the work of Helton and Vinnikov and the related Lax conjecture, that point out to the existence of specific obstructions for (the interior of) a plane curve to be semidefinite representable. In this talk we discuss a procedure to explicitly construct exact representations for convex hulls of arbitrary segments of genus zero plane curves. In particular, it is shown that the new method enables the computation of representation for particular curves, for which a generic SOS based construction fails.