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**Jonathan Hauenstein** and **Tingting Tang\*** (ttang@nd.edu). *Application of algebraic geometry in semi-definite positive problems.* Preliminary report.

In this talk, I show that solving a family of semidefinite programming (SDP) problems under affine perturbations can be converted to solving a system of quasilinear partial differential equations (PDEs) utilizing the Davidenko differential equations within the maximal perturbation set. We develop a second-order sweeping Euler scheme to approximate the boundary of the maximal set of perturbations and solve the SDPs within this set. We prove local and global error bounds for this second-order sweeping Euler scheme and demonstrate numerical results on several examples. (Received January 25, 2018)