1125-65-376 **Jeb B. Collins\*** (`jbcolli2@gmail.com`) and **Jonathan Hauenstein**. *Improving solutions to fully nonlinear second order elliptic PDEs with numerical algebraic geometry endgame techniques.* Preliminary report.

Fully nonlinear second order elliptic partial differential equations are very difficult to solve as the nonlinearity in the second order term causes issues with defining a weak form for the problem. The vanishing viscosity method was developed to approximate these equation with a fourth order perturbation term. The solution is then approximated by reducing the effect of this perturbation term. In this work, homotopy continuation techniques used in numerical algebraic geometry are utilized to vanish the perturbation term effectively for such differential equations. (Received August 30, 2016)