1135-65-1870 **Ivan Mitevski*** (im85@njit.edu), 6 Carlson Place, Lake Hiawatha, 07034, **Matthew Illingworth** (mri8@njit.edu), 12 Vincent Place, Montclair, NJ 07042, **David Youssif** (dy76@njit.edu), 19 Lakewood Ave, Hohokus, NJ 07423, and **Brittany Froese**. *Numerical methods for solving Monge-Ampere equation.* Preliminary report.

The Monge-Ampere (MA) equation is a fully nonlinear degenerate elliptic partial differential equation that arises in optimal mass transportation, beam shaping, image registration, seismology, etc. In the classical form this equation is given by $\det(D^2\phi(x)) = f(x)$ where ϕ is constrained to be convex. Previous work has produced solvers that are fast but can fail on realistic (non-smooth) data or robust but relatively slow. The purpose of this work is to build a more robust and time-efficient scheme for solving the MA equation. We express the MA operator as the product of the eigenvalues of the Hessian matrix. This allows for a globally elliptic discretization that is provably convergent. The method combines a nonlinear Gauss-Seidel iterative method with a centered difference discretization on a variety of different coordinate systems, which is stable because the underlying scheme preserves monotonicity. In order to solve these systems efficiently, the V-cycle full approximation scheme multigrid method is exploited with error correction within the recursive algorithm; this scheme is used to leverage the low cost of computation on the coarse grids to build up the finer grids. This work shows computational results that demonstrate the speed and robustness of the algorithm. (Received September 25, 2017)