NORTHERN ARIZONA UNIVERSITY

Department of Mathematics and Statistics

COLLOQUIUM
Tuesday, April 12th, 2016
4:00 – 5:00 pm, Adel Mathematics Bldg., Room 164
(refreshments at 3:45)

Jesse Mapel
NAU
M.S. Thesis Talk

Finite Difference Methods for the p-Laplacian

Abstract: The generalized eigenvalue problem for the p-Laplacian has been widely studied both numerically and analytically. So far this study has focused on utilizing minimax principles to compute variational eigenvalues. It is currently an open question if this method is exhaustive. We instead used finite difference methods and Newton's method to find eigenvalues and eigenfunctions. Using a two-step differencing scheme, we developed approaches for domains in both $\mathbb{R}$ and $\mathbb{R}^2$. In $\mathbb{R}$ our approach aligns with the standard finite difference approach. In $\mathbb{R}^2$ our approach varies from the standard one in order to compute a better approximation of gradients. If non-variational eigenvalues do exist then our approach would be able to compute them.

Algebra Combinatorics Geometry and Topology (ACGT) Seminar meets Tuesdays, 12:45 – 2:00 pm, AMB 164.
Steve Wilson will continue speaking this week.
Applied Math Seminar (AMS) meets Thursdays 12:45 – 1:45 pm, AMB 164.
This week John Neuberger will (finally) demo the *Matlab* codes from his recent colloquium.
Friday Afternoon Undergraduate Mathematics Seminar (FAMUS) meets Fridays, 3pm, AMB 164.