

Research Proposal: Radial Solutions to Nonlinear Elliptic Boundary Value Problems

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1 Introduction

When dealing with elliptical partial differential equations, it is often beneficial to consider solutions to the equations that are radially symmetric. By studying the properties of the radial solutions we can discover properties of nonradial solutions. This is a research area that has attracted a lot of attention in the last thirty years as radial solutions play a central role in the study of regularity, concentrated compactness, and related issues for nonradial solutions.

2 Proposed Research

For my thesis I will attempt to establish the properties (existence, uniqueness, bifurcation, etc.) of radial solutions to elliptic boundary value problems. Working with the results found by Jacobson and Schmitt in [1], I will try to find similar results on other elliptical nonlinear differential equations.

3 Prior Research

I took Math 180 last semester which has given me an strong introduction to dealing with partial differential equations. I will probably be working with professor Castro over the summer on a modelling project which will greatly improve my ability with partial differential equations. I will also do a substantial amount of reading over the next few months into the study of nonlinear differential equations.

References

- [1] J. Jacobsen & Klaus Schmitt, *Radial Solutions to Quasilinear Elliptic Differential Equations*, Handbook of Differential Equations, Elsevier/North Holland, Amsterdam, 2004, pp. 359-435.