

Accepted Manuscript

A BVP nonexistence proof using Green's Theorem

Joseph P. Previte, Joseph E. Paullet

PII: S0893-9659(17)30012-5
DOI: <http://dx.doi.org/10.1016/j.aml.2017.01.009>
Reference: AML 5166

To appear in: *Applied Mathematics Letters*

Received date: 1 November 2016
Revised date: 12 January 2017
Accepted date: 12 January 2017

Please cite this article as: J.P. Previte, J.E. Paullet, A BVP nonexistence proof using Green's Theorem, *Appl. Math. Lett.* (2017), <http://dx.doi.org/10.1016/j.aml.2017.01.009>.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A BVP nonexistence proof using Green's Theorem

Joseph P. Previte
Joseph E. Paullet
*School of Science,
Pennsylvania State University at Erie,
The Behrend College,
Erie, Pennsylvania 16563-0203*

January 12, 2017

Abstract

Several recent papers investigate the boundary value problem

$$\phi''(t) + \lambda\phi'(t) + \phi(t)^2 = 0, \quad t \geq 0$$

subject to

$$\phi(0) = 1, \quad \phi(\infty) = 0,$$

which arises in certain situations of boundary layer flow. Previous work on the problem established the existence of a $\lambda_{\min} \in [1, 2/\sqrt{3}]$ such that solutions exist for $\lambda \geq \lambda_{\min}$. It has been conjectured that for $\lambda < \lambda_{\min}$ no solution exists. We improve existing results by proving that for $\lambda < \lambda_1 \approx .96105$ no solution to the boundary value problem exists. The proof employs a novel application of Green's Theorem and is applicable to other boundary value problems.

keywords: boundary value problem, nonexistence, Green's Theorem

AMS Mathematics Subject Classification: 34B15, 76D10

1 Introduction

In [2] and [3], Magyari *et. al.* consider the boundary value problem (BVP):

$$\phi''(t) + \lambda\phi'(t) + \phi(t)^2 = 0, \quad t \geq 0, \tag{1.1}$$

Download English Version:

<https://daneshyari.com/en/article/5471722>

Download Persian Version:

<https://daneshyari.com/article/5471722>

[Daneshyari.com](https://daneshyari.com)