THE COMPLETE THEORY OF MATHEMATICS

S. O. BOSS[1] AND T. K. POSTDOC[2]

ABSTRACT. This study focuses on the functional framework $x(z) = \lambda z^{\mu}$ for a non-linear PDE arising from a fluid in a sphere.

Keywords and phrases: Third grade fluid, PDE, Sphere
2010 Mathematical Subject Classification: A80

1. INTRODUCTION

During the past few decades, research in flows involving heat transfer of non-Newtonian fluids has been intensified.

2. PRELIMINARY

We define some basic results from Kim [1] for the benefit of all.
Definition 1: A solution $u \in \Omega$ is called a α-weak solution of the boundary value problem ...

3. THE HEART OF THE MATTER

The heart of the matter is to state without proof the following:
Lemma 1: (A Sobolev's embedding) Let $u \in \Omega$. Then we have the estimate

$$\int r^m u'v'dr + (a-m)\int r^{m-1}u'vdr = \int r^m[h-g(u)]vdr, \quad (1)$$

Next we proof the main theorem:
Theorem 1: (A priori estimates). Let u be a solution of ...
Proof: We split the proof into two steps.

The solution to equation (1) is investigated numerically and ...

Table 1. Comparison of perturbation and numerical result with $\Lambda = \Gamma = 1$ and $\delta = 0.2$.

γ	θ_{max}(PS)	θ_{max}(NS)	Rel. error
0	0.6439	0.6635	1.94%
1	0.6458	0.6684	2.39%
2	0.6476	0.6737	3.87%
4	0.6513	0.6846	4.87%
5	0.6531	0.6904	5.40%

[1]Corresponding author
[2]Supported by ICTP, grant number T4538

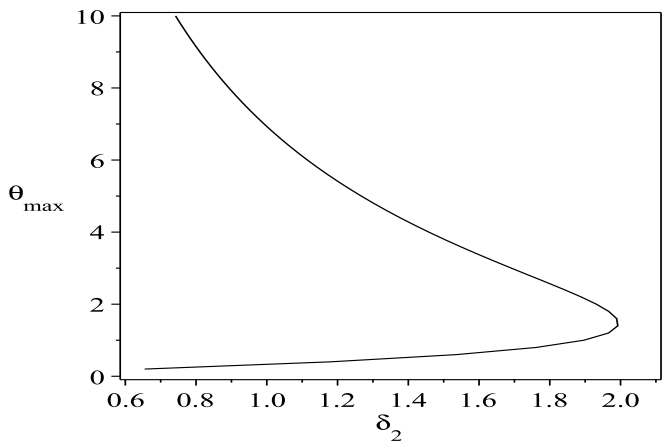

Fig. 1. Bifurcation plot for a variable viscosity when $\Gamma = \Lambda = 1$.

4. CONCLUDING REMARKS

Functional framework (see Evans and Alli [2])has been employed to generate analytical solutions of a model reaction diffusion equation. Table 1 demonstrates the comparison of solutions.

In Fig. 1, the critical value of the temperature is plotted against Newtonian parameter δ.

ACKNOWLEDGEMENTS

The author would like to thank the anonymous referee whose comments improved the original version of this manuscript.

NOMENCLATURE

$\theta_{max\ cr}$	Non-dimensionless temperature of the model
ϵ	Activation Energy

REFERENCES

[1] S. O. Kim, *Thermal stability of a reactive non-Newtonian flow in a sphere*, Int. Commu. Heat and Mass Transfer **60** (1) 70-81, 2009.

[2] L. C. Evans and P. A. Alli, *Partial Differential Equations*, American Mathematical Society, Providence, Rhode Island, 1998.

[3] H. A. Okoye, *How to define reasonably weighted Sobolev spaces*, Ph.D. thesis, University of Uyo, Uyo, Akwa Ibom State, Nigeria, 2009.

DEPARTMENT OF MATHEMATICS, OBAFEMI AWOLOWO UNIVERSITY, ILE - IFE, NIGERIA

E-mail address: bossnms@gmail.com

DEPARTMENT OF MATHEMATICAL SCIENCES, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA

E-mail addresses: sspostdoc@yahoo.co.uk,firstdoc@oauife.edu.ng