COVENTRY
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Pulsating Flow Maldistribution in Automotive Exhaust Catalysts - Numerical Modelling and Experimental Correlation

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A thesis submitted in partial fulfillment of the University's requirements for the Degree of Doctor of Philosophy

July 2003

Coventry University in collaboration with ArvinMeritor Inc.

Abstract

Complete the Abstract in 3 paragraphs each paragraph not exceeding 80 words (1 page)

Paragraph-1:

You need to bring in

1. The work you have chosen to do
2. The reason for selecting this work and its scope.

Pargrapgh-2:

Methodology and Methods used for solving the chosen problem

Paragraph-3:

Main results and conclusions drawn

Acknowledgement

1. Acknowledge your academic and industry supervisor
2. Acknowledge your programme manager
3. Acknowledge all those who have helped you directly or indirectly for the successesful completion of your project work
4. Remember it is an opportunity to express your gratitude

Length: Not to exceed one page

Table of Contents

A typical Table of Contents page looks like this

List of Tables

A typical List of Tables content page looks like this

How to represent a table:

Table number, Table title, Units of the parameters are important

Table 2. Enthalpy of formation of some common Elements and Compounds

Species	Reaction	State	ΔH_f kJ/kmol
Oxygen, O_2	-	gas 25°C, 1 atm	0, element
Hydrogen, H_2	-	gas 25°C, 1 atm	0, element
Carbon, C	-	gas 25°C, 1 atm	0, element
Carbon dioxide, CO_2	$C + O_2 \rightarrow CO_2$	*gas 25°C, 1 atm**	−393 522
Carbon monoxide, CO	$C + O \rightarrow CO$	*gas 25°C, 1 atm**	−110 529
Water vapour, H_2O	$H_2 + 1/2O_2 \rightarrow H_2O(g)$	*gas 25°C, 1 atm**	−241 827
Water (liquid), H_2O	$H_2 + 1/2O_2 \rightarrow H_2O(l)$	liquid 25°C, 1 atm	−285 800
Nitric oxide (NO)	$1/2N_2 + 1/2O_2 \rightarrow NO$	*gas 25°C, 1 atm**	+89 915
Methane, CH_4	$C + 2H_2 \rightarrow CH_4(g)$	*gas 25°C, 1 atm**	−74 897
Ethane, C_2H_6	$2C + 3H_2 \rightarrow C_2H_6(g)$	gas 25°C, 1 atm	−84 725
Propane, C_3H_8	$3C + 4H_2 \rightarrow C_3H_8(g)$	gas 25°C, 1 atm	−103 916
Butane, C_4H_{10}	$4C + 5H_2 \rightarrow C_4H_{10}(g)$	gas 25°C, 1 atm	−124 817
Iso-octane, C_8H_{18}	$8C + 9H_2 \rightarrow C_8H_{18}(g)$	gas 25°C, 1 atm	−224 100
Iso-octane, C_8H_{18}	$8C + 9H_2 \rightarrow C_8H_{18}(l)$	liquid 25°C, 1 atm	−259 280
Methyl alcohol, CH_3OH	$C + 2H_2 + 1/2O_2 \rightarrow CH_3OH(g)$	gas 25°C, 1 atm	−201 200
Methyl alcohol, CH_3OH	$C + 2H_2 + 1/2O_2 \rightarrow CH_3OH(l)$	liquid 25°C, 1 atm	−238 600
Ethyl alcohol, C_2H_5OH	$2C + 3H_2 + 1/2O_2 \rightarrow C_2H_5OH(g)$	gas 25°C, 1 atm	−234 600
Ethyl alcohol, C_2H_5OH	$2C + 3H_2 + 1/2O_2 \rightarrow C_2H_5OH(l)$	liquid 25°C, 1 atm	−277 000

* Note: the values of ΔH_f given in the tables of gas properties are based on 0 K.

List of Figures

Typical table of List of Figures

How to represent a Figure

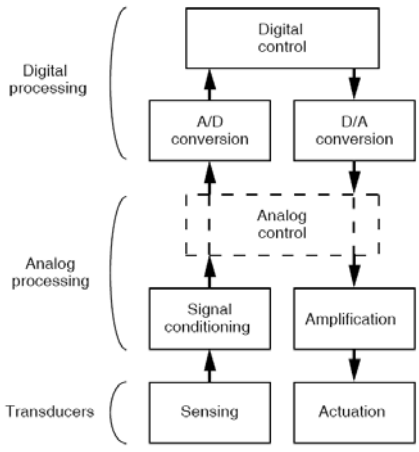

Figure 2.7 Levels of functionality required for control system. Arrows indicate information flow.

Nomenclature

a	= Acceleration (m/s^2)
F	=Force (N)
T	= Temperature (K)
t	=Temperature (^oC)
N	=Speed (RPM)
CG	=Centre of Gravity
DOF	=Degrees of freedom
W	=Track width (m)

1 – Introduction

Length of Introduction: 2-3 pages

What introduction should contain:

Introduction presents the specific problem under study. Introduction can have

1. General Introduction to the area of your work
2. Actual Area of your work
3. Specific Area of your work
4. Specific topic of your work

You can use figures, tables and references while giving introduction

Assume that you are interested in developing optimised blade profile for a wind mill, your introduction can have

1. General introduction-energy, importance, sources, merits and limitations
2. Smooth transition should take over to Wind Energy and its relevance
3. Then move over to Horizontal wind mills if you are working on horizontal windmill blades and the introduce the blades
4. Bring the reason and importance of blade shapes and why they need to be optimised
5. State that it is essential and important to work in this area as it going to benefit the society, connect it to the next chapter that is Literature Review.

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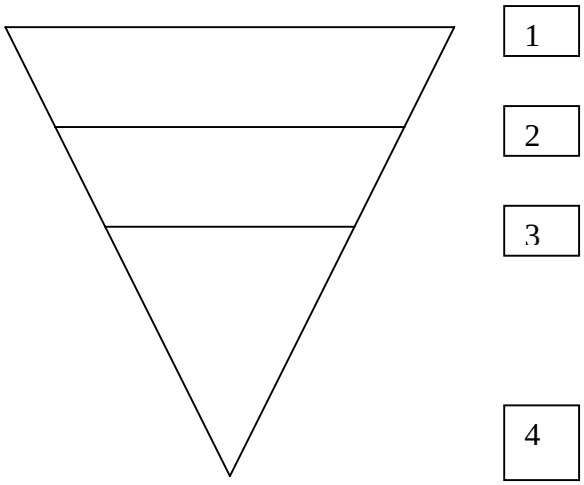
The following diagram represents the approach



Sample-1

2 – Literature Review

Length- 10-12 Pages

Minimum of 10 references

A literature review may constitute an essential chapter of a thesis or dissertation, or may be a self-contained review of writings on a subject. In either case, its purpose is to:

- Place each work in the context of its contribution to the understanding of the subject under review
- Describe the relationship of each work to the others under consideration
- Identify new ways to interpret, and shed light on any gaps in, previous research
- Resolve conflicts amongst seemingly contradictory previous studies
- Identify areas of prior scholarship to prevent duplication of effort
- Point the way forward for further research
- Place one's original work (in the case of theses or dissertations) in the context of existing literature

3 – Problem Definition

Length: 1-2 pages

3-4 lines of introduction to the chapter

Problem definition

Paragraph-1

Problem Statement: Aim

Pargraph-2

Objectives

Paragraph-3

Methodology adopted to meet the objectives

OBJECTIVES: Objectives are statements of mentions. They inform the reader clearly what the researcher plans to do in his/her work. They must identify the variables involved in research. Objective should start with an action verb and be sufficiently specific, measurable, achievable, relevant and time bound (SMART).

4 – Model Construction and Solution

3-4 lines of introduction to the chapter

1. Specifications of the model you are trying to design and analyse
2. Basic design calculations- Formulae, Flow charts, programme (Flow charts and Programme can be pushed to Appendix)
3. Geometric model
4. Mathematical model, Theoretical basis
5. Discretisation of the Geometric Model, Grid independence
6. Boundary conditions
7. Solver settings and importance
8. Solutions
9. Modifications to the problem if any
10. Repeating the procedure if required
11. Manufacturing if any
12. Test procedures and test results if any

Do not add screen shots of every step you work on in your report. Only main software features that help you to create the models are required to be mentioned.

If it is totally experimental work:

1. Building up of experimental set-up
2. Instrumentation involved and their accuracy
3. Calibration of instruments and test set-up
4. Measurement procedures
5. Repeatability
6. Tabulation of data and calculations
7. Error Analysis any

5 – Validation and Discussion of Results

RESULTS must be presented in the form of

- Text,
- Tables
- Illustrations-graphs, figures, circuit diagrams, animations

The contents of the tables should not be repeated in the text. Instead, a reference to the table number must be given.

Validation:

Check whether
Theoretical solutions to your problem is available with you or in any references
Experimental results are available with you or with in some reference material
Verify /Validate your results with the available results.
If you are not verifying or validating your results, your results will be questioned; you should be in a position to defend your results- in such cases bench marking is necessary.
To bench mark-choose a standard problem in the area for which theoretical or experimental solutions are available, solve the problem using the method you have chosen for your project and compare your results
Electronics students can check their algorithm by implementing on the hardware
Product design students can covert their ideas into physical modelling and results be compared and do an analysis by preparing a questionnaire
You need to provide explanations for the trends in your graphs and tables. The explanation should be based on theoretical background

6 – Conclusions and Recommendations for future work

This is the last section of the text in which conclusions or inferences drawn on the basis of the results of study are described. The conclusions should be linked with the objectives of the study. If possible to express your concluding remarks based on certain numbers, please do so. If you have developed correlations, give such correlations.

Recommendations for further research may be included when appropriate e.g. if you find a statistically significant number of cases of anaemia of severe degree in the school going girls of a particular area you can recommend further research to probe the cause of anaemia in that area.

It is important to be careful that the conclusions should not go beyond data and should be based on the study results and population.

References

[1] Ervin, R. D., (1983) "The Influence of Size and Weight Variables on the Roll Stability of Heavy Trucks," SAE Paper # 831163

[2] Laird, Leslie A., (1988) "Measurement of Heavy Vehicle Suspenison Roll-Stability Properties, and a Method to evaluate Overall Stability Performance," SAE Paper # 881869

[3] Ranganathan, R., Rakheja, S. and Sankar, S., (1989) "Kineto-static roll plane analysis of articulated tank vehicles with arbitrary tank geometry," Int. J. of Vehicle Design, Vol. 10, No. 1, pp. 89-111.

[4] Ranganathan, R., Rakheja, S. and Sankar, S., (1990) "Influence of Liquid Load Shift on the Dynamic Response of Articulated Tank Vehicles," Vehicle System Dynamics, Vol. 19. No. 4, pp. 177-200.

[5] Rakheja, S., Piche, A. and Sankar, T.S. (1991) "On the development of an early warning safety monitor for articulated freight vehicles", Int. J. of Vehicle Design, Vol. 12, No. 4, pp. 420-449.

Harvard Method

Appendix-A

Any material, which is important but affects the flow of your writing can be brought under appendix

SOURCE CODES FROM ANSYS

FULL TRUCK 3D CYLINRICAL PENDULUM MODEL

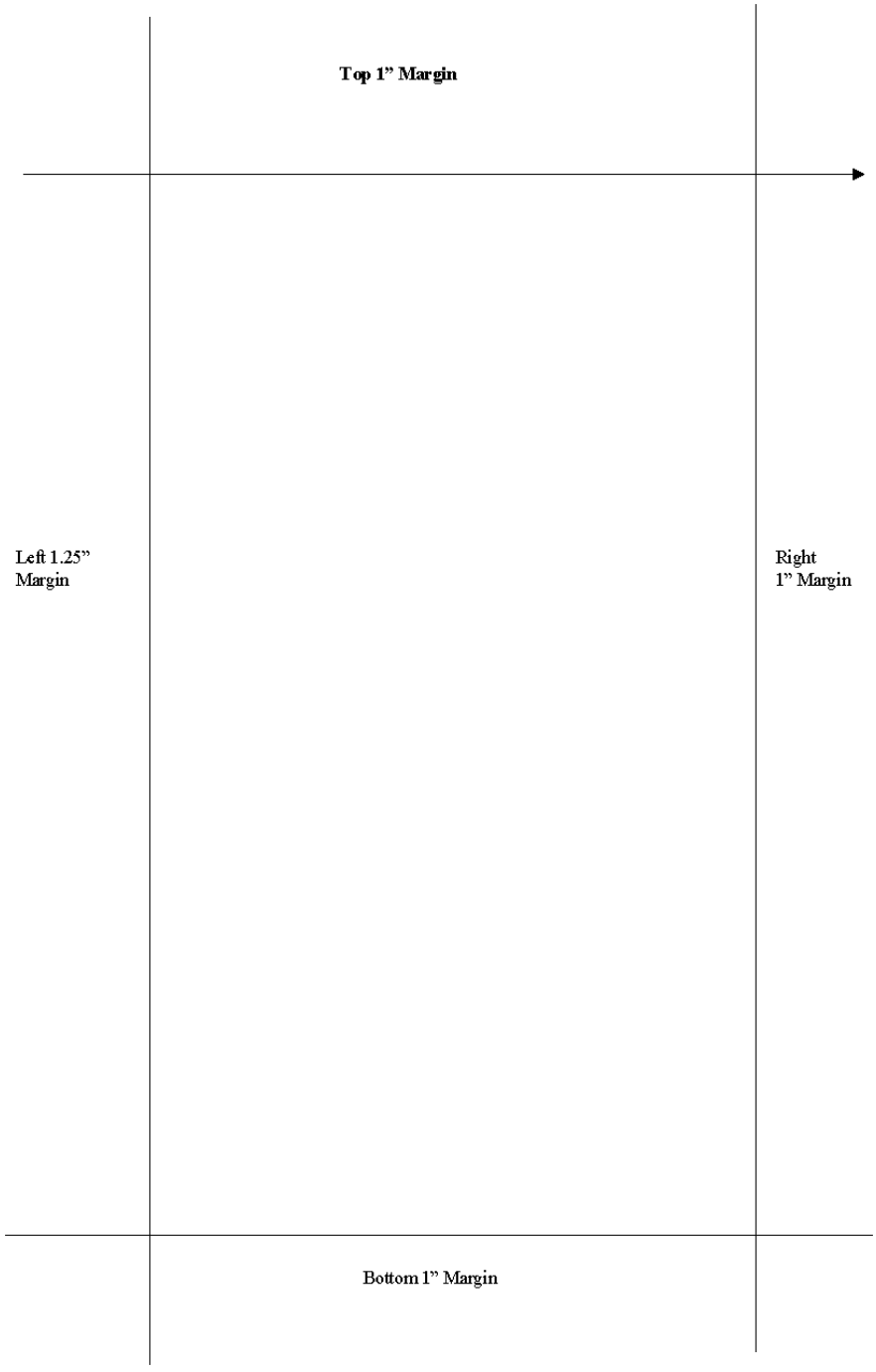
```
!                CYLIDRICAL PENDULUM WIREFRAME MODEL
!             GAP ELEMENTS INCLUDED BUT COMMENTED OUT
/FILNAM, "INSERT SOME RUN NAME HERE"
/CONFIG,NRES,10000           !ALLOWS ANSYS TO READ ALL 835 LOAD CURVES
/TITLE,Tanker Truck Stability

/PREP7
!*
!*********************************************************************
!R1 IS THE REARMOST COMPARTMENT OF THE VEHICLE

R1 = .581
R2 = .590
R3 = .599
R4 = .607
R5 = .616
R6 = .624
R7 = .633

PENMASS1= 875.34
FIXMASS1= 745.66

PENMASS2= 891.55
FIXMASS2= 729.45

PENMASS3= 907.76
FIXMASS3= 713.24

PENMASS4= 923.97
FIXMASS4= 697.03

PENMASS5= 940.18
FIXMASS5= 680.82

PENMASS6= 956.39
FIXMASS6= 664.61

PENMASS7= 972.6
FIXMASS7= 648.4

!*********************************************************************
******
!*
MAT,1,                       ! MATERIAL 1 TABLE  (NORMAL STEEL)
!Stl_AISI-C1020.SI_MPL
MP,EX,1,2.07E11
MP,NUXY,1,.29
MP,DENS,1,7850
!*
```

Appendix-B

Appendix-C

General Guidelines

1. A good dissertation can be written only if you have good piece of work
2. A good piece of work will be ignored if not presented properly
3. Remember –you are writing it because you want others to read
4. If you do not use sufficient care in writing, one will doubt whether you have taken good care in your work either
5. Use clear and short sentences and write in third person. Avoid using bombastic words
6. All the assumptions and input data should be documented
7. It should be possible to reproduce your computations/experiments by others using your dissertation.
8. Use British English-spelling
9. Units and consistency in the use of units is important
10. Use A4, white sheet for printing your dissertation. Use font size of 12, Times Roman, headings can be of same font size but bold.
11. Margins should be as shown in the figure


Top 1" Margin
Left 1.25"
Margin
Right
1" Margin
Bottom 1" Margin