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A Thesis Submitted

in Partial Fulfilment of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

by

Name of the Student

(Entry Number)

DEPARTMENT OF XYZ

INDIAN INSTITUTE OF TECHNOLOGY ROPAR

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The lay or public summary is a simplified version of the abstract that explains the key goals and contributions of the research/scholarly work in terms that can be understood by the general public. it does not use technical terms and discipline-specific language. It must not exceed 450 words in length. For more details, refer guidelines for thesis preparation of IIT Ropar.

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The abstract is a critical part of a scientific paper; in fact, it may be the only part people read. An abstract is a short summary of a longer work (such as a dissertation or thesis) usually about a paragraph (∼350 words) long. The abstract concisely reports the aims and outcomes of your research so that readers know exactly what the thesis is about. Although the shortest section of a paper, writing an abstract if often considered the hardest section of a manuscript to write. Often limited by word length, writers must adequately and concisely summarize their research for broad audiences. The abstract should not exceed 500 words. Write the abstract last or revise you abstract, when you've completed the rest of the dissertation. For more details, refer guidelines for thesis preparation of IIT Ropar.

Keywords: Keywords 1; Keywords 2; Keywords 3; Keywords 4; Keywords 5; Keywords 6;

List of Publications

Journal articles, conference paper, book chapters, patents on the topic of the thesis published by the candidate may be separately listed in this section. List of publications is anticipated to cover both published manuscripts (articles) and unpublished ones (about to submit/under review/accepted manuscript).
Use any reference format (ACS, APS, APA, Harvard) consistent with your thesis. Only requirement is to be consistent within the thesis along with your area of study.

Journal
Article 1
Article 2

Conference Proceeding
Article 1
Article 2

Book chapter
Chapter 1

Patent
Patent 1

The list of publication may also be placed at the end of the thesis, after Appendix as per student/supervisor wish

Contents

List of Figures

List of Tables

List of Symbols

μ	dynamic viscosity, Pa-s
ρ	density, kg/m^3

Chapter 1

Introduction

You can decide your own number of chapters and chapter names, based on your work.

1.1 Introduction

Chapter 2

Literature Review

2.1 Literature

This is an example of citing a reference: Prasad and Goyal [1] developed a strain based computational model which predicts the new bone sites on the periosteal surface.

You can also cite as follows [2].

For more information about referencing citation, you can go through this document.

2.1.1 In-line mathematics

You can write mathematics in a line by using \(and \), e.g., $\sigma = E\varepsilon$

2.1.2 Equation without numbering

$$\rho\frac{D\vec{V}}{Dt} = -\nabla p + \rho\vec{g} + \mu\nabla^2\vec{V}$$

2.1.3 Equations with numbering

Here a newcommand '\pde' is used to write partial differential equation. The command has been defined in *packages.tex* file. You can cross-refer an equation as follows: Equation 2.1 is the Laplace's equation.

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0 \tag{2.1}$$

$$\begin{bmatrix} \sigma_1 \\ \sigma_2 \\ \sigma_3 \\ \sigma_4 \\ \sigma_5 \\ \sigma_6 \end{bmatrix} = \begin{bmatrix} C_{11} & C_{12} & C_{13} & C_{14} & C_{15} & C_{16} \\ & C_{22} & C_{23} & C_{24} & C_{25} & C_{26} \\ & & C_{33} & C_{34} & C_{35} & C_{36} \\ & & & C_{44} & C_{45} & C_{46} \\ & symm & & & C_{55} & C_{56} \\ & & & & & C_{66} \end{bmatrix} \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \\ \varepsilon_5 \\ \varepsilon_6 \end{bmatrix} \tag{2.2}$$

2.1.4 Equations array

$$\frac{\partial}{\partial t}\left(\rho A\frac{\partial u}{\partial t}\right)-\frac{\partial}{\partial x}\left(EA\frac{\partial u}{\partial t}\right)-f=0,\quad 0<x<L \tag{2.3}$$

$$\left(EA\frac{\partial u}{\partial x}\right)\Big|_{x=L}-P=0 \tag{2.4}$$

2.1.5 Using bold font with math mode

Here, $\boldsymbol{\nabla}$ and $\boldsymbol{\sigma}$ are in bold font.

$$\int_{\Omega}\tilde{w}(\boldsymbol{\nabla}_s^T\tilde{\boldsymbol{\sigma}})d\Omega=0\quad\forall\, w$$

2.1.6 Align equations

You can use '&' for aligning equation about a symbol as follows:

$$\begin{aligned}(\log N_f)^{-1/2} =&1.20551064+0.66002143\ \mathrm{S}+0.18040042S^2-0.00814329\ \mathrm{S}^4+0.00025308\mathrm{RS}^4\\ &+0.00021832\mathrm{TS}^4-0.00054660\mathrm{RT}^2-0.005567\mathrm{RH}^2-0.00293919\mathrm{HR}^2\\ &+0.0119714\mathrm{HT}-0.00051639\mathrm{H}^2\ \mathrm{T}^2\end{aligned}$$

$$\begin{aligned}V&=\iiint\rho^2 sin\theta d\rho d\theta d\varphi\\ &=\int_0^{2\pi}\int_0^{\pi}\int_0^{r}\rho^2\sin\theta d\rho d\theta d\varphi\\ &=2\pi\int_0^{\pi}\int_0^{r}\rho^2\sin\theta d\rho d\theta\\ &=4\pi\int_0^{r}\rho^2 d\rho\\ &=\frac{4\pi}{3}\rho^3\end{aligned}$$

Chapter 3

Methodology

3.1 Adding a table

Table 3.1 shows the compositions of the materials used in the study.

Table 3.1: The chemical composition of base metal and weld metal by wt. (%)

Material		**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**N**	**S**	**P**	**Fe**
DSS 2205		0.02	0.84	0.41	22.84	4.65	3.80	0.186	0.003	0.028	Bal.
ER 2209		0.01	1.80	0.40	22.70	8.50	3.20	0.160	0.001	0.015	Bal.

3.2 Adding a figure

You can use vector files (*.eps, .pdf*) or image files (*.jpeg, .png*) to insert a figure (see Figure 3.1). One can use Ipe drawing editor or LaTexDraw to make schematics figures in vector format.

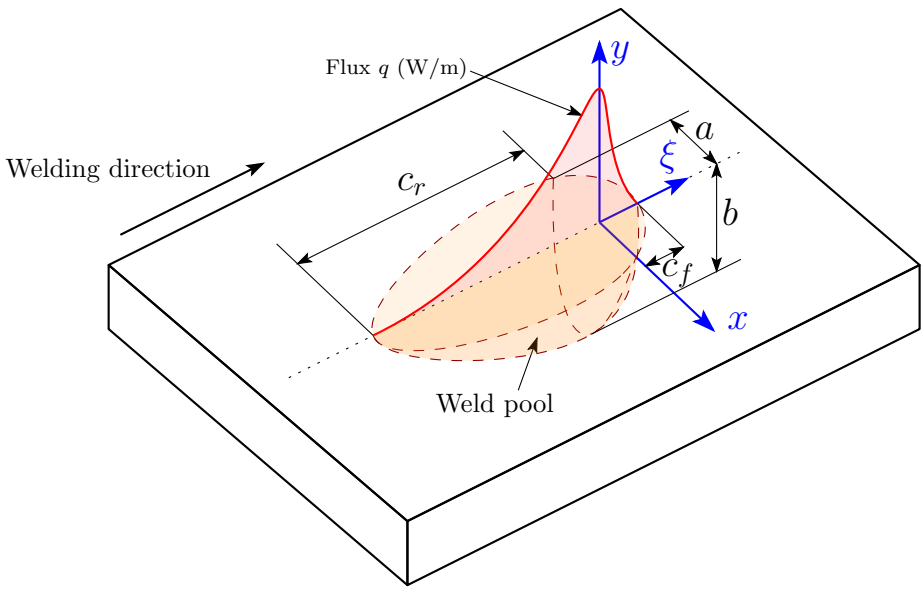

Figure 3.1: A schematic

3.3 Adding sub-figures

This is an example of cross-referring figures. Figure 3.2a shows the slip plane in a FCC system.

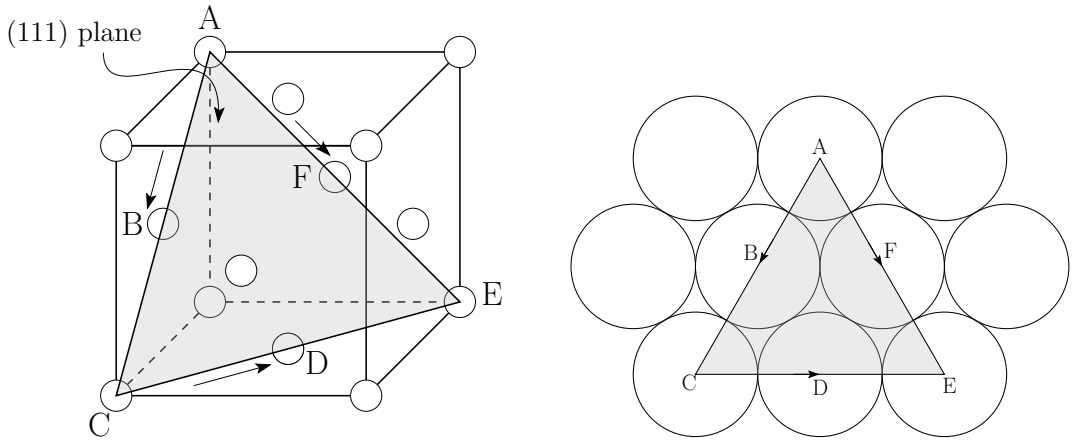

Figure 3.2: An schematic representation of (a) face centred cubic slip system, (b) (110) plane

Chapter 4

Results and Discussion

4.1 Results

Chapter 5

Conclusion

5.1 Conclusion

References

[1] Jitendra Prasad and Ajay Goyal. An invertible mathematical model of cortical bone's adaptation to mechanical loading. *Scientific reports*, 9(1):1–14, 2019.

[2] Celine Cabet, Laura Carroll, and Richard Wright. Low cycle fatigue and creep-fatigue behavior of alloy 617 at high temperature. *Journal of Pressure Vessel Technology*, 135 (6), 2013.

Chapter A

Appendix Title