6 August 2019

Look through Izaak and David's work (Recursion, L-systems, Material modelling)

Milestone 2

General case

Start journal to keep track of decisions and changes, such as mesh sizes and element numbers

Milestone 1

10x10 empty grid with pressure all around inner surface

Simple elements

Either EcoFlex or Smooth Sil 950

Print a physical model and compare its behaviour to modeled behaviour

13 August 2019

For hand-ins for feedback:

Don't write like skripsie

Use recorder as well as taking notes during feedback sessions

Prof Venter:

As good as you can get it

Thorough and pedantic feedback

Don't give rough work

Dr Venter:

Sees different things from Prof Venter

Doesn't notice spelling errors

15 August 2019

Presentation Tips

Use consistent formatting (Capital letters, bold, italics, underline, etc.)

Keep it simple; explain immportant terms to unfamiliar audience

Use nice pictures, crop out unnecessary parts

Use a nice template (not skripsie template)

16 August 2019

Implement unit testing for functions

Basic set of known inputs and outputs used to check if function is behaving as expected

Writing tips

Start writing in this year

Write as you go along

Submit chapter by chapter for feedback

Don't be shy with images/graphs

27 August 2019

Implementation of 10x10 empty square:

Use Mold-Star 15 material

Use symmetry constraints to bound the material

Download and install NX 12, Marc Mentat, and LSDynam

Model square on all those

Look at examples in the manuals and online

Use linear properties first for an isotropic model, then change the material model

Look at and understand time transience of the model

Set up a VPN to use the software away from the office

Work through PolyFEM by Jorgen Bergstrom

Presentation:

Present narrative of project as a whole

Generate locomotives

Using recursive smal elements with simple properties to obtain more complex behaviours and emergent properties like David and Izaak

Build individual components

Use boundary energy minimization

ftp://saturn.meg.sun.ac.za

Username: postgrad

Password: postgrad456

29 August 2019

Before starting to write, compile a Table of Contents

Work through Table of Contents with supervisor to determine proper layout

Bind at Post-Net

Use LS Pre/Post

10x10 NX12 Model

1D Model:

Standard setup

45 mm length lines (50+40/2)

5 elements per line

10N along curve inwards

PBeam bar (10mmx10mm)

Steel

2D Model

Standard setup

50 mm outer lines, 40 mm inner lines, 10 mm breadth

Extrusion 10 mm (-5 mm, 5 mm)

Midsection between planes to get 2D shell elements (outer and inner plane to get shell pointing outward, to apply pressure)

10 mm elements resulting in 10 square elements

10 MPa per side

Steel

3D Model

Standard setup

50 mm outer lines, 40 mm inner lines, 10 mm breadth

10 mm elements, element type?

11 September 2019

Explicit FEM

Many small timesteps

Better for non-linearity

Implicit FEM

Larger timesteps with multiple iterations at each timestep

Do proper literature early on

20 September 2019

NX 12:

10x10 Model

Set as 2D solid

Non-linear solver:

Don't use 106 or 129, rather use 601 or 701

601:

Static/implicit

No velocity or inertia

Generates a stiffness matrix and solves for it

If a solution is obtained, it is correct

701:

Explicit

Always obtains a solution, but may not always be correct

LSDyna:

Download help files

LS Pre/Post only for pre- and post-processing

Use LSDyna for analysis

Literature review:

e-mail Zack for references

1 day a week

SAIMechE Conference:

Abstract

Presentation

VPN:

Call IT

Ubuntu 18.04