**Thursday: 22 Feb 2018, 11-12 AM, Chris’s office**

**Presents: Jagir, Gib, Chris, Hashem:**

**To do list:**

Traction force and visualisation in CMGUI:

Trying to define the versions on nodes and provide the growth factors on them. (Jagir helped with a code which reads the fields, we need to have them visualised.)

Thinking of a way to show the components of the traction force with arrows in CMGUI (Richard might be able to help)

Find it out why the traction forces get negative values near (V-shape region on top of the DM) (Maybe Chris checks how the traction force is being calculated) Maybe I should try to read a more refined mesh to see how the traction forces are replying to that.)

Re-running some of the simulations + monitoring results:

Re-run the simulations with ALPSO for sub-stags after 16, as there was a bug in BC on top ring

Monitor the results of the rest of them, and run SLSQP for those ones who are in a good range of answer. (almost 10 out of 24 sub-stages are about to converge, from tomorrow I need to stop some extra runs and run parallel examples for lazy sub-stages)

Documenting the code:

We are documenting the growth code with jupyter. Andre and Girish gave some comments, maybe Elyas will read it more seriously)

Major comments + some of my concerns:

* Where are the results
* It is too long, sectioning may help
* Make the cells need to be bigger (Maybe CellML part needs more graphical description)
* How to verify the code is working properly?
* Solvers ??? odeIntegratorSolver

+

(One missed) The DM membrane properties:

The myocardium and CJ consist of 68,504 tetrahedral (C3D4) elements, and the SPL and foregut membranes consist of 10,231 triangular (M3D3) elements

These authors characterized the myocardium and CJ of HH12 chick hearts as homogeneous isotropic materials using a strain-energy density function in the form:

W = A/B(eB(I1-3) −1) + 1/D(J\*2 - 1)/2 - ln J\*)

where *A* and *B* are material constants, and I1 = *J*\*−2/3 tr (**F**\*T · **F**\*) is a modified strain invariant.

For myocardium and CJ, *A*MY = 13.0 Pa, *B*MY = 0.57, *A*CJ = 3.2 Pa, *B*CJ = 0.39, and *D*MY = DCJ= 0.01.

*A*SPL = 2*A*MY = 26.0 Pa, *B*SPL = BMY = 0.57, *D*SPL = DMY = 0.01 for the SPL as well as the foregut.

**Issues which are discussed:**

Visualising the growth rates in cmgui …

Some comments on the documentation on top of Girish and Andre’s comments

Some discussion about the SPL properties ,,, plotting the graph of energy might be useful in two methods (Taber’s method compared to ours )

What would be the effect of using or not using UpdateStart/UpdateFinish after copying fields in this code or when we have parallelisation

What population size would be the best … why some of the sub-stages are lazy. (If the provide a better answer with another set, do we need to say that the method is not robust?)

How is we can analyse the sensitivity … 64 variables or 96 … or finding some method to do that?

**Plan for the next week:**

* Applying the changes that were required for the code documentation:

+ We need to run in a spellchecker.

+ CellML needs to become better, better pictorial descriptions

+ Sectioning

+ Some charts are very big, therefore, make them smaller

+ Some issues are there in the main flowchart, needs to be explained

* Plotting the Energy from Taber’s paper with Mooney-Rivlin model that we are using.
* Cmiss example for plotting two other rates, visualisation
* Solving an example of a 16x16 mesh to see the results of the traction force on the location of DM BCs.
* Getting the codes to have answers ,,, + run on SLSQP (16/24 needs to go to SLSQP), maybe a rerun on ALPSO for the lazy 8 sub-stages is required





