The Figures in “Ca2+ transient duration explains the difference between isotonic and isometric cardiac end-systolic force-length relations” were generated via openCMISS. Follow the instructions below to reproduce figures 4-8 from the journal article:

1. Download openCMISS from <http://opencmiss.org/>
2. Download the models and code from <https://models.cellml.org/workspace/4ca>
3. Determine which model/ protocol pair(s) you need to run in order to generate all necessary data for the figure you wish to reproduce. To do this, see the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Python Protocol | Main Model | Ca2+ Model used by Main: | Cross-bridge (XB) Model used by Main: | Output shown in figures: |
| 🖒 main\_WL\_dynamicCai.py | THR\_dynamicCai.cellml | Cai\_Dynamic.cellml | cross-bridge.cellml | 4, 5, 6 (black lines) |
| 🖒 main\_WL\_fixedCai.py | THR\_fixedCai.cellml | Cai\_Fixed.cellml | cross-bridge.cellml | 7, 8  (black lines) |
| 🖒 main\_Isometric.py | THR\_dynamicCai.cellml | Cai\_Dynamic.cellml | cross-bridge.cellml | 4, 5, 6, 8  (grey lines) |

1. Run the models. Keep the default parameter values in order to replicate figures.

>> python.opencmiss.old␣ Python Protocol ␣ Main Model

example:



1. The output files will be saved in the same folder as the models according to the following naming protocol:

WL = work-loop contraction

isometric = isometric contraction

F = fixed Ca2+

D = dynamic Ca2+

Work-loop contraction csv files will contain “afterload” followed by a number in the name. This is the value of the afterload the contraction was run at (e.g. WL\_D\_afterload0.2576.csv)

Isometric contraction csv files will contain “SL” followed by a number in the name. This is the value of the sarcomere length the contraction was run at (e.g. Isometric\_D\_SL2.231.csv)

If the csv file contains data from a work-loop contraction run with fixed Ca2+, the file will contain “afterload” followed by a number in the name as well as “CaiSL” followed by a number. The CaiSL number signifies the sarcomere length of the isometric contraction from which the fixed Ca2+ was emulated (e.g. WL\_F\_afterload0.1911\_CaiSL2.024.csv).

1. After all necessary data are generated, run the section in Guidry\_manuscriptFigures2.m that corresponds with the figure you wish to reproduce (look at the heading of each section) .