# Notes about Matlab Modelling Seminar

- Mathematical modeling is the use of a mathematical to describe a system or process.

- Technical Computing Workflow

    Inputs <—> build a model <—> share
  we want to automate this process, streamline it if you will.

- Modelling methods
    - Parametric Modelling — used when relationship is known between some things (ie. a linear model fits this category).

  easier than coding in data. ⟶ - Many ways to import data, but I know this from my online class. Importing using the (import data button) will make it easy to edit missing #'s, variables, etc.

  easier than coding plots ⟶ ✳ - can also make graphs interactively w/ the plots tab.
    - your getting and cleaning data class will be extremely useful.
    - big thing is that when using interactive tools to make nice plots, Matlab will write the code to generate it for us using
        File → generate code.

    - Curve fitting app will make linear or parametric models for us (like lm in R), $R^2 = 1$ is perfect fit for lines and data. To create a model, if we use the generate code button, we get a function that reads data to answer our questions.
    - Live scripts are super useful for this. Like Rmd's.

— Black Box modelling — Used when we don't have a known relationship between input & output.

   — Regression Learner is the app to use for this. Bring the data in, then you can begin working. Remove any unnecessary details.

— First Principles Modelling — not reliant on data. Used when no data is had and is based on the laws of physics or other worldly known properties.

  — can do symbolic math in Matlab, ie, we can program Newton's 2nd law ~~with the~~ to model a pendulum.

  — Seems like this is more for engineers, but still super cool.

  — seems more difficult, just needs practice.

  — relies on knowing how to code symbolic math in here.

— The scripts can be exported into a pdf or html format, just like rmd.

Super Cool!