**Instructions on how to run the Framework Model in MATLAB**

The main run function is frameworkmodel.m, which requires input arguments of temperature (in 0C), sunrise and sunset times (in the 24-hour format), CO2 level (CO2 partial pressure in Pa which is about one tenth of a ppm), light intensity (in micromol m-2 s-1), genotype(1 for Ler, 2 for Col) and probability of leaf appearance (0-1).

A few parameters that should be calibrated to experimental data:

1. Water content (line 359 in frameworkmodel.m)
2. Flowering time, which can be adjusted in two ways:
   1. Adjusting the threshold value in the photothermal model (Line 23 for Ler and Line 34 for Col in phenology.m)
   2. Direct input as hours to flowering (Days to flowering x 24) at line 60 in frameworkmodel.m. This overwrites the value simulated by the photothermal model

MATLAB-file directory:

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| **File name** | **Remark** |
| allocation.m | Component for carbon allocation in the carbon dynamic model |
| assimilation.m | Component for carbon assimilation in the carbon dynamic model |
| flowering4.m | ODE for the photoperiodism model |
| flowering4bcjac.m | Jacobian for the ODE solver |
| frameworkmodel.m | Main run function file |
| ini\_carbon\_balance.m | Initialisation of the carbon dynamic model |
| link.m | ODE solver to entrain the photoperiodism (clock) model prior to actual start-time to determine the stable limit cycle |
| mainres.m | Component for maintenance respiration in the carbon dynamic model |
| organdemand.m | Component for organ demand in the carbon dynamic model |
| parameter.mat | Parameter values for all except the photoperiodism model |
| phenology.m | Main run function for the photothermal model |
| photosynthesis.m | Photosynthesis component (the Farquhar model) in the carbon dynamic model |
| plant\_carbon\_balance.m | Main run function for the carbon dynamic model |
| sublink.m | ODE solver for subsequent time points |
| translocation.m | Translocation component in the carbon dynamic model |
| vpaper.mat | Parameter values for the photoperiodism model |
| weather.mat | Index file for the meteorological data |

The main function files for the existing models are highlighted in orange. Note that the functional-structural plant model is embedded within the main framework model.