

Help & Documentation*

Codes of this library is written by of Hydro Group members.

1 Dynamic Model

The Dynamic Model excel file is provided here and its use is explained here.

1. **Fahrenheit_to_Celsius(temp_cel)** converts Fahrenheit temp. to Celsius. Celsius is the proper form of temp. used in the model.

Input:

- **temp_cel** A real valued temp. or a column of a data frame containing the temp in the Celsius format.

output

- A real valued temp. in Fahrenheit or a column of data frame.
2. **initiate_data_frame(col_names, init_temp_c, const)** Creates a new data frame of size 2×13 and fills in the cells which are to be used by dynamic model. It corresponds to rows 11 and 12 of the model given in the excel file.

Input:

- **col_names** The names of columns of the data frame to be used in the model.
`col_names = [date, time, temp_c, temp_k, ftmp, sr, xi, xs, ak1, Inter-S, Inter-E, delt, Portions]`
- **init_temp_c**. Initial temps. corresponding to cells C11 and C12 of the excel file. `init_temp_c = (15, 12)`.
- **const** An object of the class **constants** containing constants of the model. They are given below and in the D1 through D8 cells of the excel file.

*Name of the programmer of functions is written in the code for debugging purposes. If you see any flaw, please contact the programmer.

Table 1: `const` object

e0	e1	a0	a1	slp	tetmlt	aa	ee
4.15E+03	1.29E+04	1.40E+05	2.57E+18	1.6	277	a0 / a1	e1 - e0

output: A data frame of the following form.

Table 2: initial data frame to construct the model with.

date	time	temp_c	temp_k	ftmprt	sr	xi	xs	ak1	Inter-S	Inter-E	delt	Portions
None	None	15	288	16.93	22471935.51	1	v.81	.09	0.00	.07	0.00	0
None	None	12	285	12.44	252887.94	1	1.11	.06	.07	.13	0.00	0

3. `fill_in_the_table(given_table, const)` This function takes the `const` object and `given_table` as input and runs the model to fill in the proper information that we need to compute the Chill Portions which is the ultimate goal of the model.

input:

- `given_table` Is the data frame that contains the first two rows, like the one given by Table 2 and the first three columns, from row 3 to the end, are provided by datalogger and are read off the disk. Anything from the column `temp_k` onward is computed and filled by this function.
- `const`: The object containing constants of the model mentioned before.

output: A complete table that has the Chill Portions for the data of out orchard.

4. `dynamic_model(path_to_data, col_names, init_temp_c, const)`

This function takes the path of the file we wish to compute the Chilling portions for, along with other inputs that we have already mentioned before, and produces the Chilling Portions.

input:

- `path_to_data`: the path to the data location on the disk.

- **col_names**: Name of the columns of the data frame, like mentioned before. These names has to be exact, because they are used for computations in the model.

NOTE: These data should have temp. in Celsius. And it is assumed the first three columns are **date**, **time** and **temp** respectively.

- **init_temp_c** Initial temp. as mentioned before.
- **const**: An object containing the constants of the model.

output: A data frame containing all information we need. (Shall I change this so that it just gives the **Portions**?)

2 Other functions

1. `rgb2gray(image)` takes an RGB image as an input and returns its gray scale image using MATLAB's RGB coefficients (0.2989, 0.2989, 0.114).