EME172 Discussion 1

(1) Show the EME172 web page

- Where to download Ch, Ch control toolkit and ChSciTE.

(2) Show hello.c in ChSciTE.

- basic structure of a C program
  - header file :
    - contain declaration of functions, variables, and other identifiers
  - main function :
    - Every C program must have a primary function, the main function.
    - The main function serves as the starting point for program execution.
    - The main function contains what is going to be performed by the program.
    - A program usually stops executing at the end of the main function, although it can terminate at other points for a variety of reasons.
- run hello.c in ChSciTE and Ch shell
- show the debugging functionality of ChSciTE and Ch shell

(3) Introduce CControl class

Create a transfer function model using Ch control toolkit. The transfer function of the system is

$$\boldsymbol{H}(\boldsymbol{s}) = \frac{\boldsymbol{s}}{\boldsymbol{s}^2 + 2\boldsymbol{s} + 10}$$

Program:

```
/* File: example1.ch */

#include <control.h>

int main() {
    CControl sys;
    array double num[2] = {1, 0};
    array double den[3] = {1, 2, 10};

    sys.model("tf", num, den);
    sys.printtf();

    return 0;
}
```

Description:

(1) `control.h` declares `CControl` class.

(2) A class holds data and functions.

(3) An object is an instantiation of a class. In terms of variables, a class would be the type and an object would be the variable.

(4) Use dot operator "." to access public member data and functions of a class.

(5) Need to look up the Ch control toolkit user's guide for more information about the usage of each function.

Run `example1.ch` in ChSciTE or Ch shell, and the output will be

```
Transfer function parameters:
Numerator: 1.000000*s+
Denominator: 1.000000*s*s+2.000000*s+10.000000
```