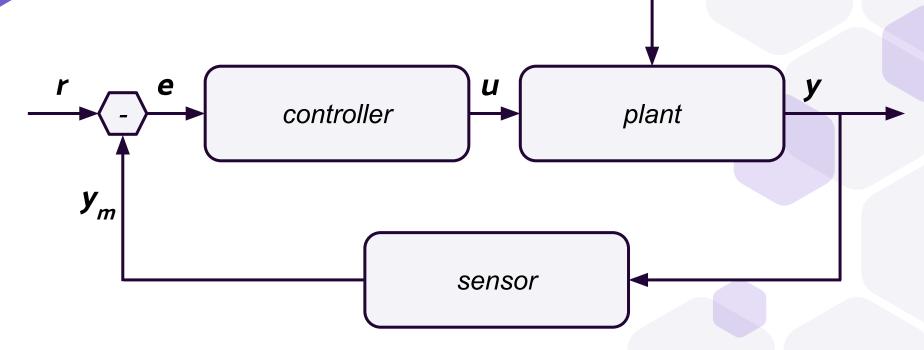
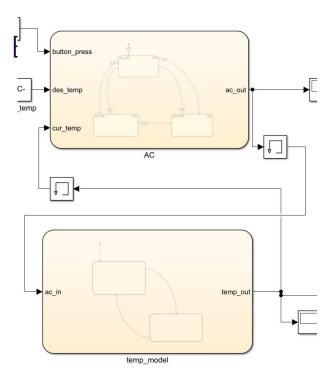
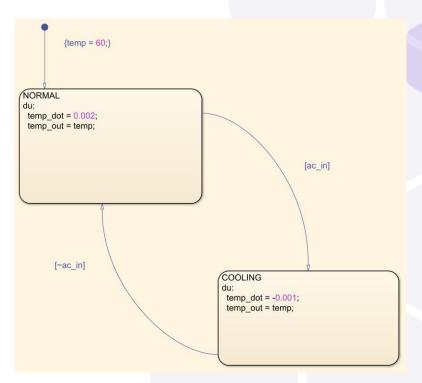
Modeling systems w/ feedback in simulink

Feedback loops and control



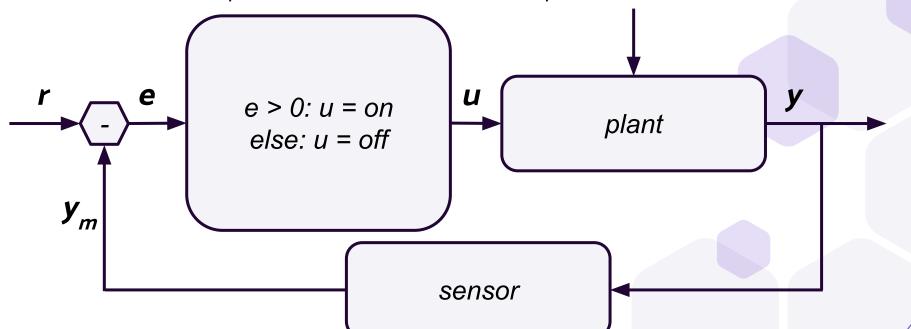
Air conditioner temperature model





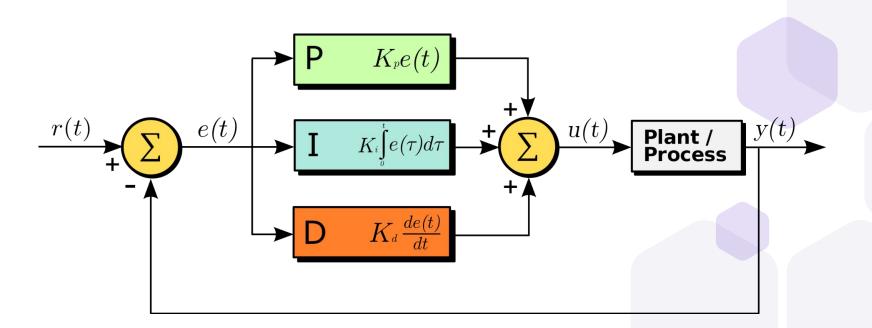
Bang-Bang controller

Controller output is 2-state ({on, off}, {up, down}, etc)



PID controller

For continuous controller outputs



Board and simulink discussion of PID

```
\{clk = 0; p c = 0; i c = 0; d c = 0; old error = 0; int term = 0;\}
            PID
            du:
             clk dot = 1;
             ac out = p c + i c + d c;
             int_term_dot = cur_temp - des_temp;
[clk \ge 100]{clk = 0; p_c = P * (cur_temp - des_temp);}
            d_c = D * (cur_temp - des_temp - old_error)/ 100;
            old error = cur temp-des temp;
            i c = I * int term; int term = 0;}
```