

9.10R Robotics Challenges- Proportions Control Robot

Task

To design a self correcting Robot using it's sensors to monitor and keep a system behaving correctly.

The system uses **Closed loops** which provide feedback.

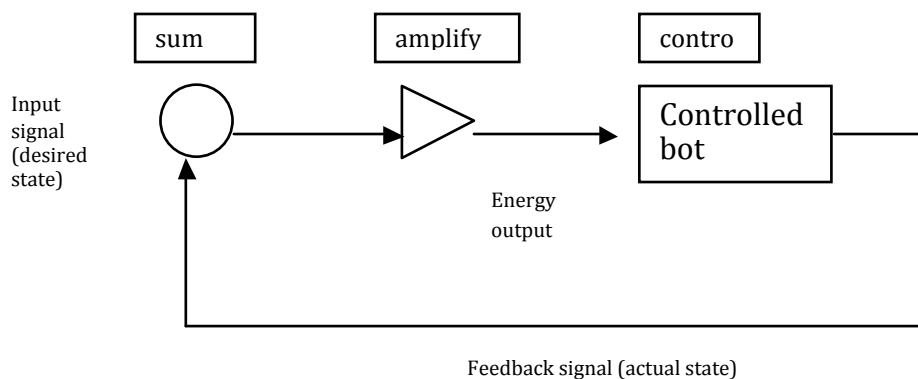
This means sensors are used to control outputs like motors and lights.

The feedback comes from measurements recorded from the input sensors being compared to a set point and a difference determined.

The difference is used to determine the level required from the output.

The greater the difference, the greater the level of control (**proportional control**)

Typical proportional Control Loops



To handle an immediate error, the error is multiplied (amplified) by a constant K_P and the new value fed back to the controller (e.g. a motor, heater, pneumatic valve etc.)

Projects to try

1. Light Follower - This is where a robot moves faster as it gets closer to the light. (you could also make a light avoider that runs away from the light by going faster as it gets darker)
2. Echo Locator - A robot echo locator is like sonar because it sends very high frequency sound called ultrasonic waves from the ultrasonic sensor and determines the distance by timing the return of the reflected signal. To make it seem more authentic we can convert the distance to a sound frequency so the further away it is the higher the frequency.
3. Edge follower - the difference between the light reading in the middle of a black taped line and the edge is used to keep the robot on track.
4. Sentry Bot - using the ultrasonic sensor set the distance to an object and when the object moves forwards so does the robot, keeping the same distance away.

