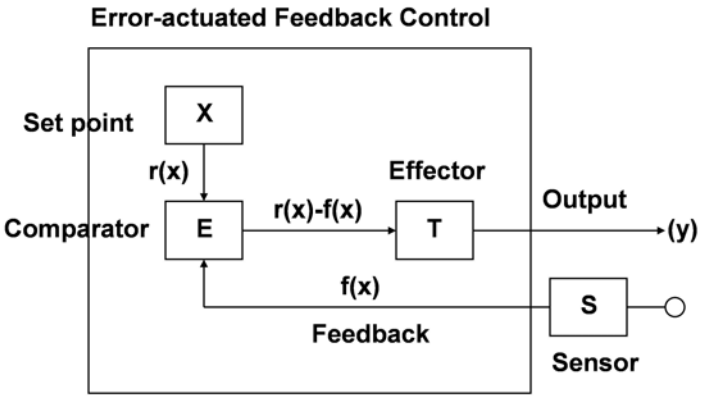
HOMEOSTATIC REGULATION

Negative Feedback

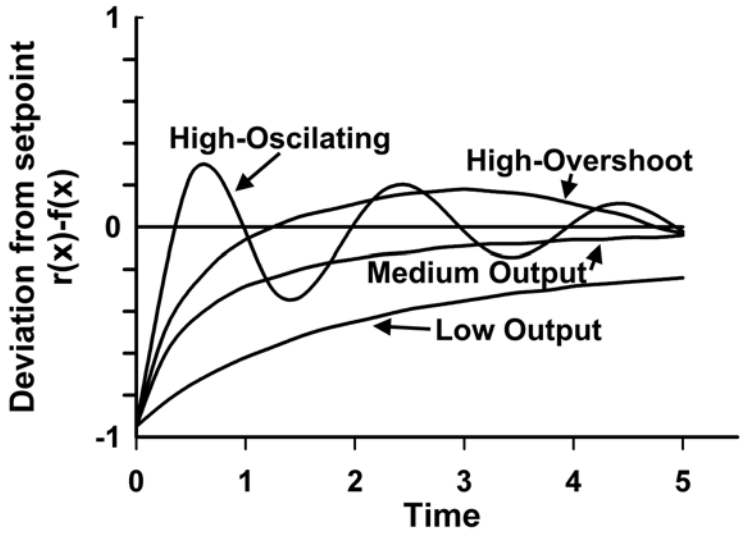
Regulation depends on a negative feedback loop, which is an “error-actuated” system which works by responding to a deviation from the setpoint (r(x)-f(x)) by producing an output (y) which corrects the deviation.



The **Setpoint (X**) and the **Sensor (S)** each send a signal to the **Comparator (E**, eg. in electronics an amplifier), which outputs a signal **(r(x)-f(x))** to the **Effector (T)**, which typically transduces the signal to release the **Output (y)**, thereby reversing the deviation from the setpoint. The r(x)-f(x) signal and output are often proportional to the magnitude of the difference.

Negative-Feedback Response curves

Feedback Response depends on magnitude of output, the nature of the control signal (fixed, proportional, etc.), and the load on the system causing the deviation.



(Adapted from Riggs, D.S. 1970. *Control Theory and Physiological Feedback Mechanisms*. Williams & Wilkins, Co. Baltimore.)