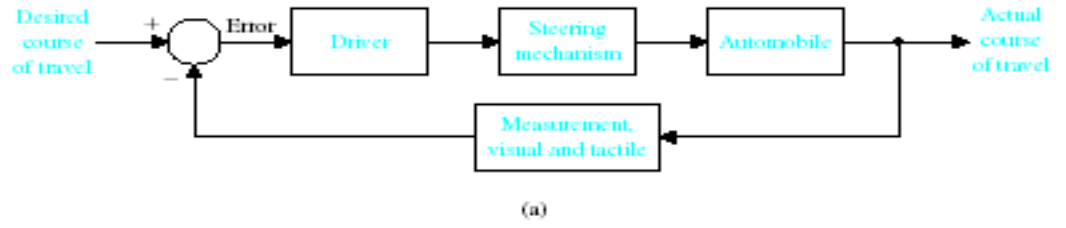
UNIT-1

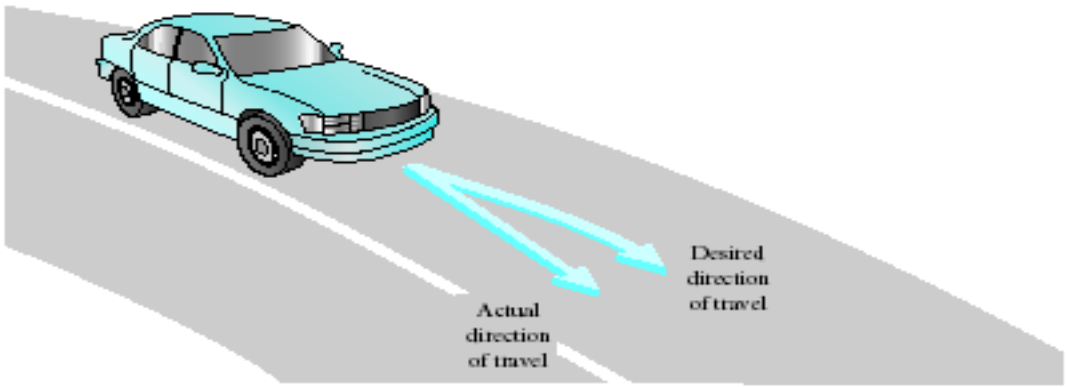
(Lecture-8)

Modeling of Physical Systems

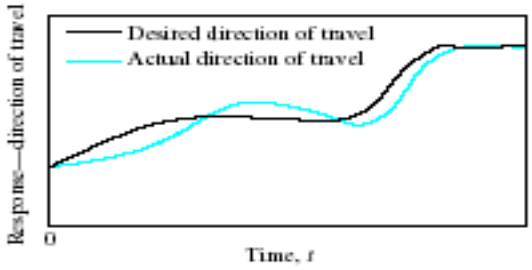
Examples of Modern Control Systems



(a)



(b)



(c)

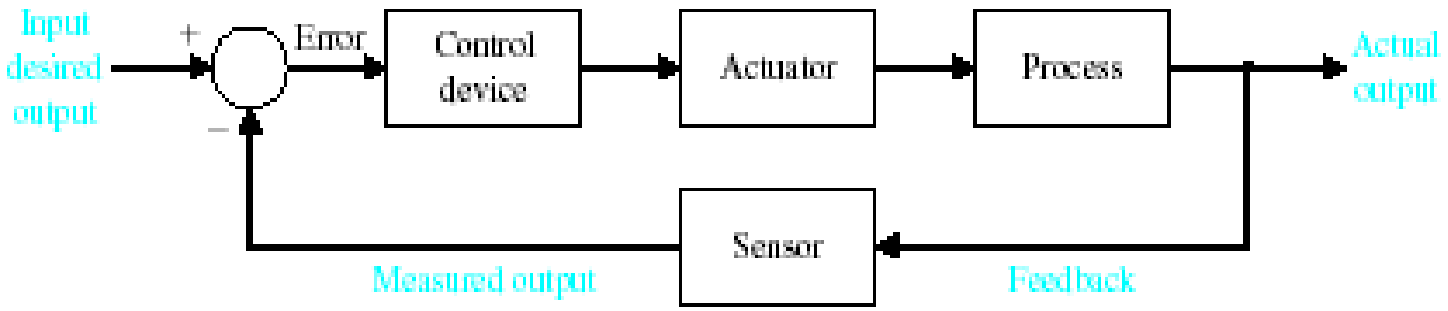
(a) Automobile steering control system.

(b) The driver uses the difference between the actual and the desired direction of travel

to generate a controlled adjustment of the steering wheel.

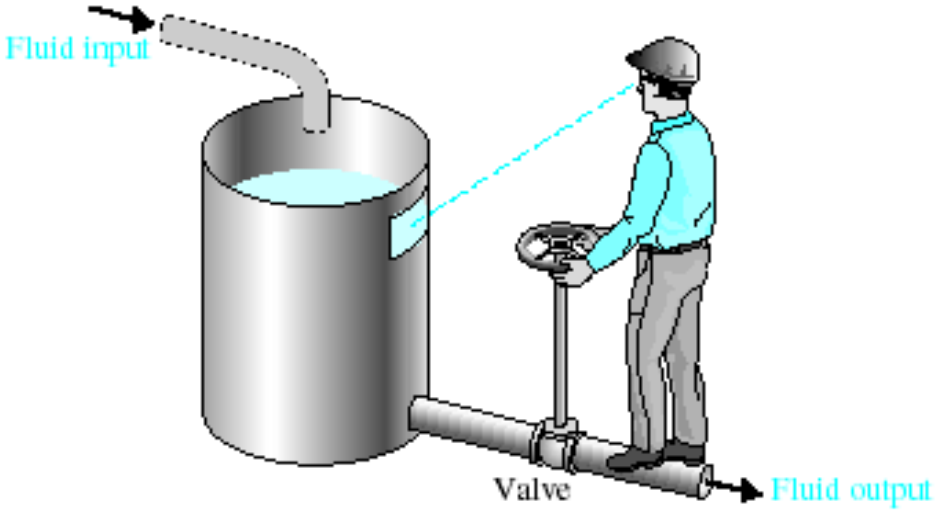
(c) Typical direction-of-travel response.

Examples of Modern Control Systems



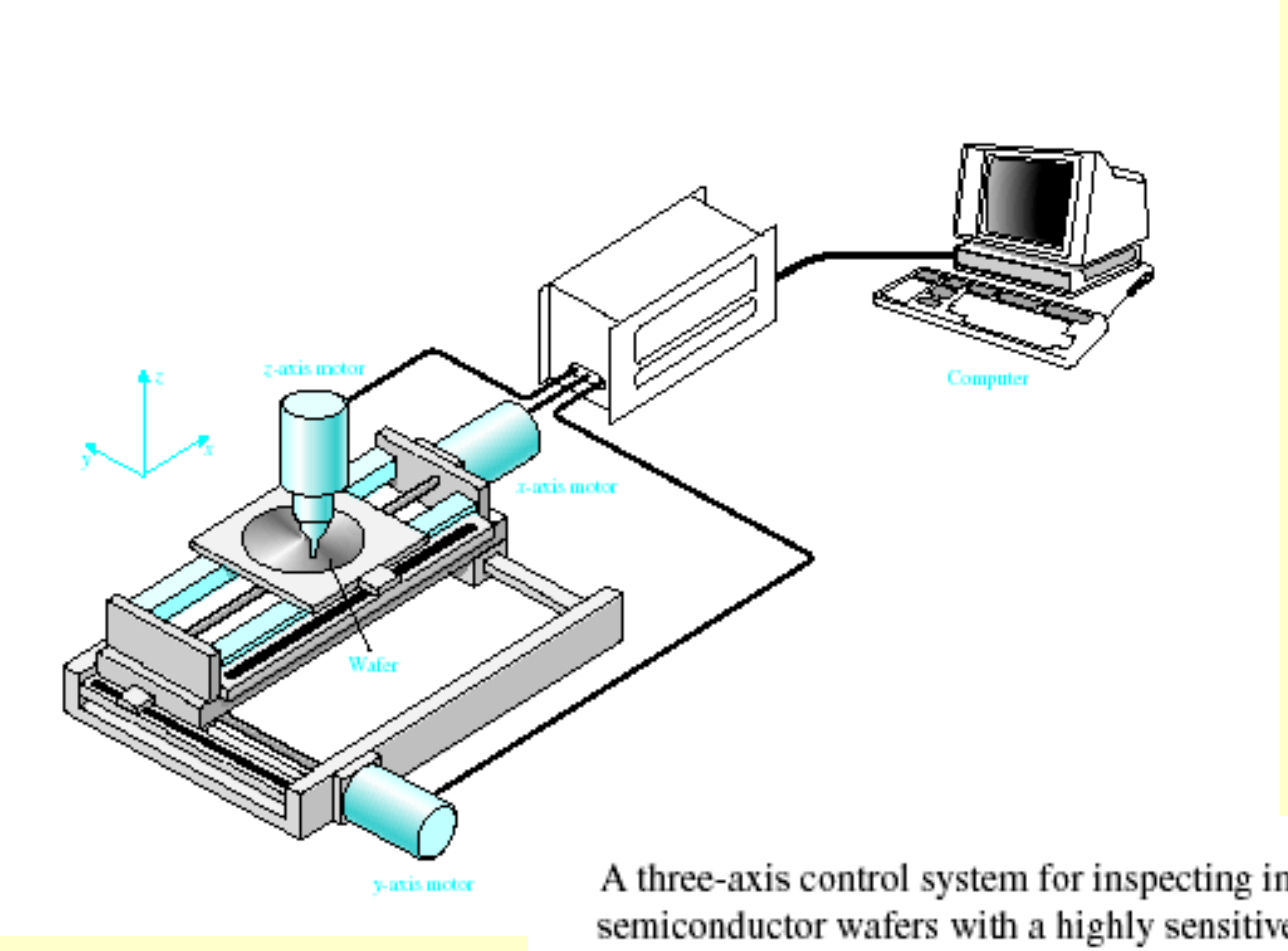
A negative feedback system block diagram depicting a basic closed-loop control system. The control device is often called a "controller."

Examples of Modern Control Systems



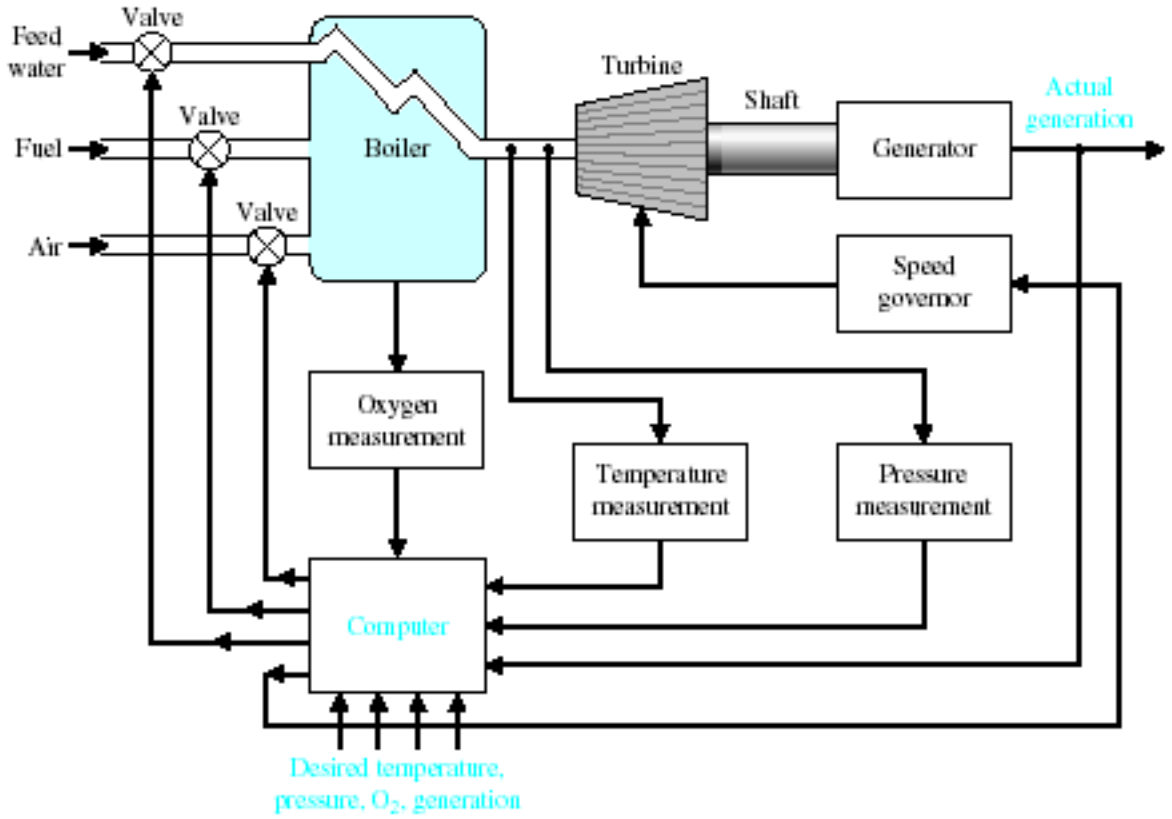
A manual control system for regulating the level of fluid in a tank by adjusting the output valve. The operator views the level of fluid through a port in the side of the tank.

Examples of Modern Control Systems



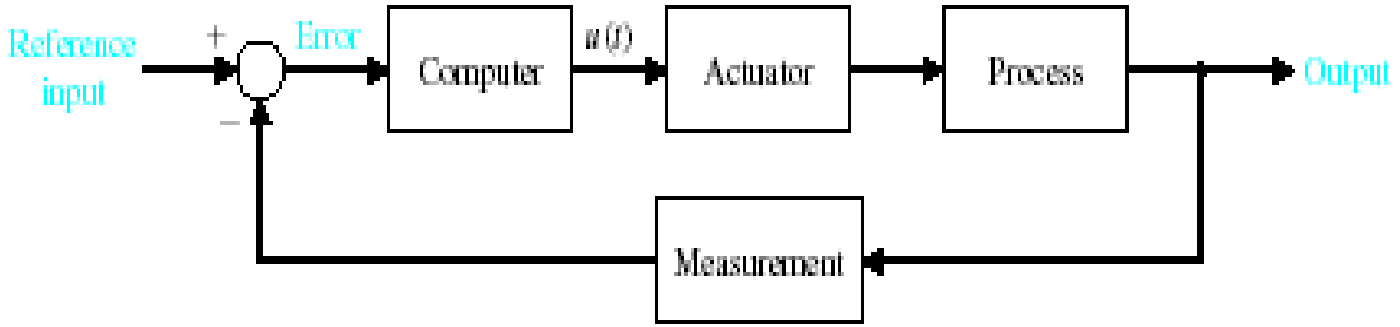
A three-axis control system for inspecting individual semiconductor wafers with a highly sensitive camera.

Examples of Modern Control Systems



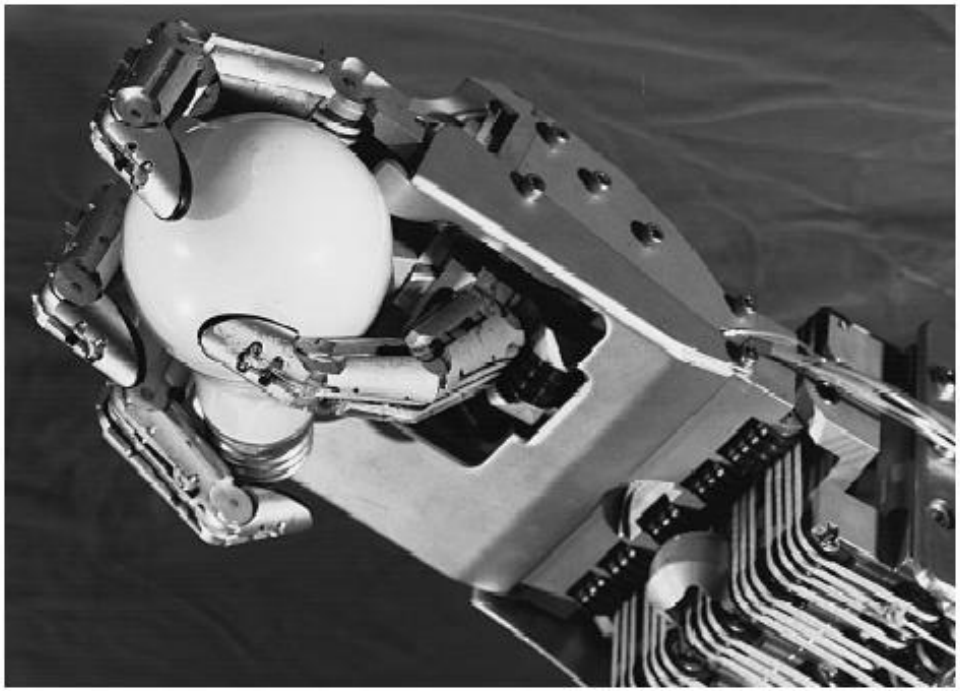
Coordinated control system for a boiler-generator.

Examples of Modern Control Systems



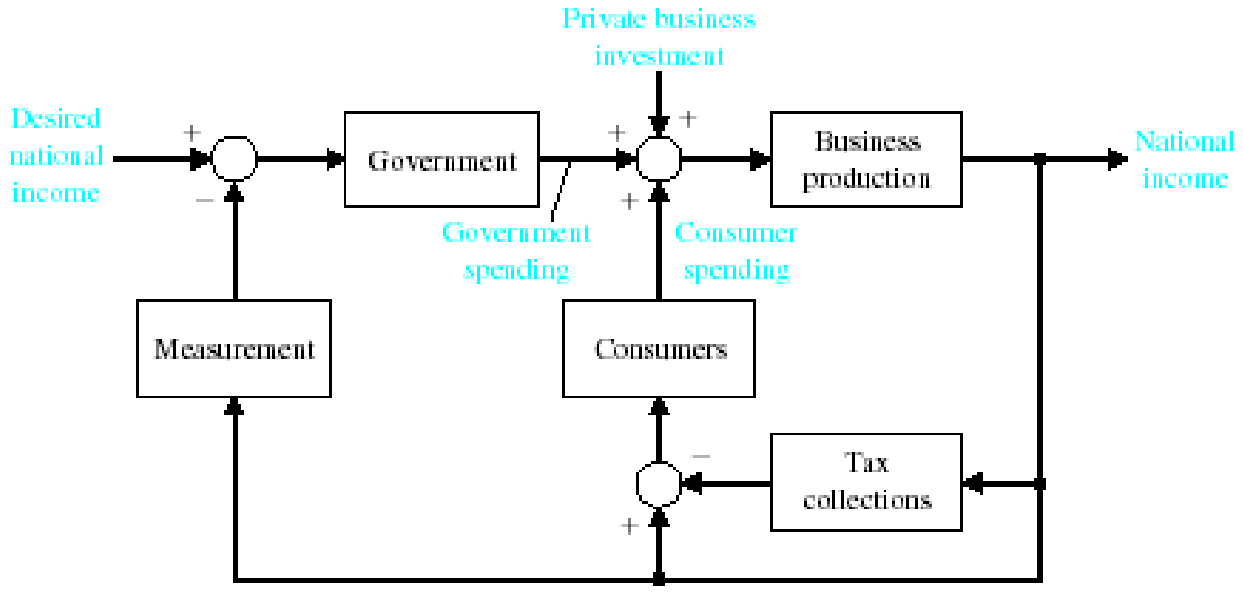
A computer control system.

Examples of Modern Control Systems



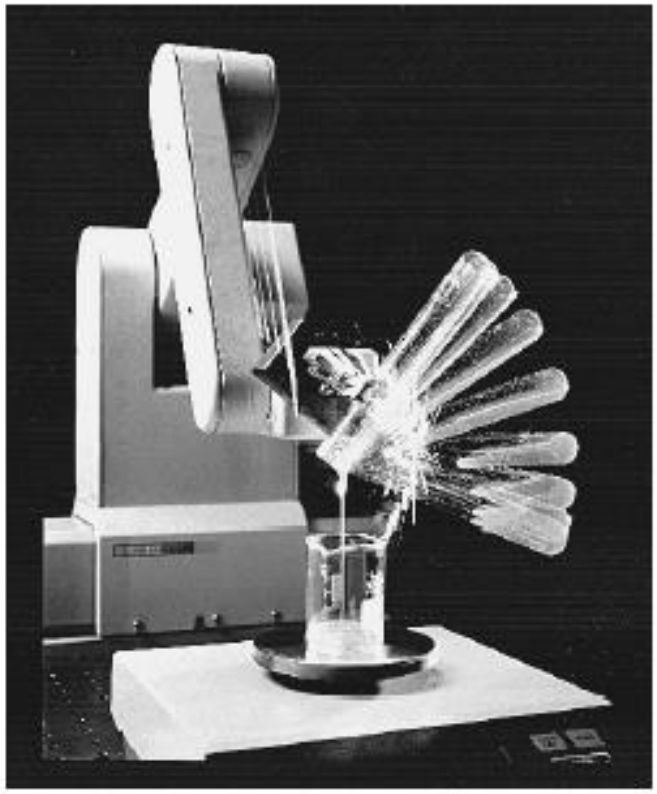
The Utah/MIT Dextrous Robotic Hand: A dextrous robotic hand having 18 degrees of freedom, developed as a research tool by the Center for Engineering Design at the University of Utah and the Artificial Intelligence Laboratory at MIT. It is controlled by five Motorola 68000 microprocessors and actuated by 36 high-performance electropneumatic actuators via high-strength polymeric tendons. The hand has three fingers and a thumb. It uses touch sensors and tendons for control. (Photograph by Michael Milochik. Courtesy of University of Utah.)

Examples of Modern Control Systems



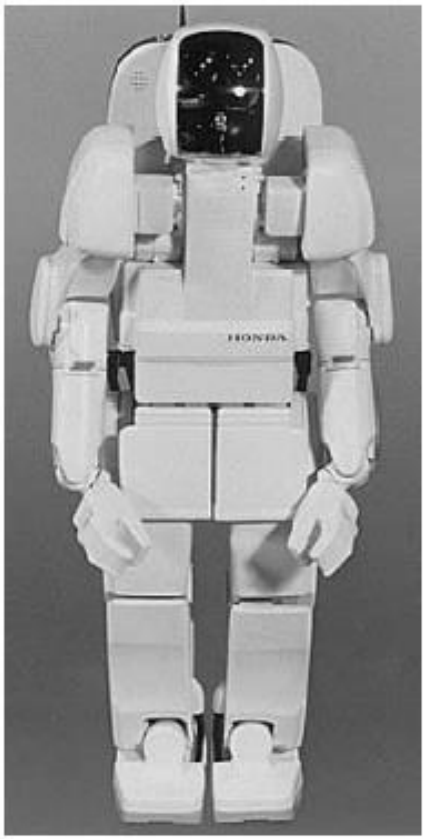
A feedback control system model of the national income.

Examples of Modern Control Systems



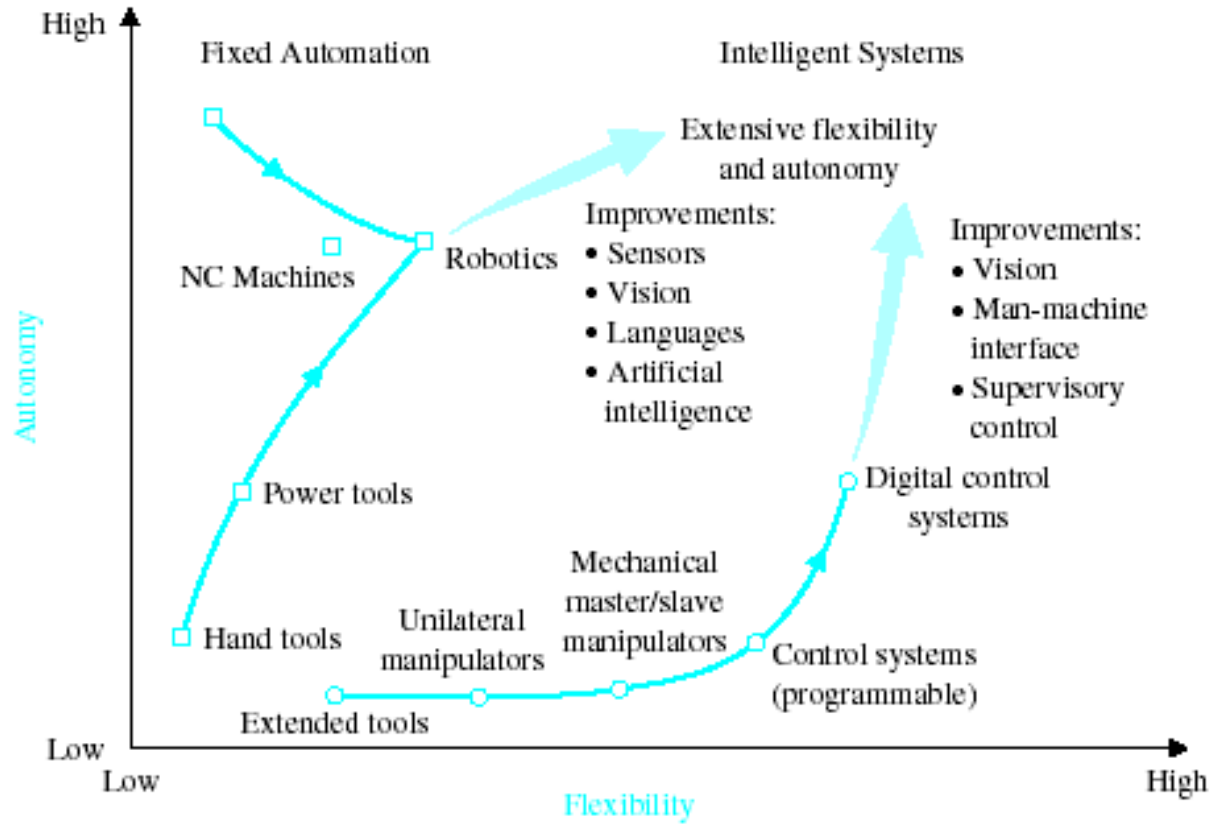
A laboratory robot used for sample preparation. The robot manipulates small objects, such as test tubes, and probes in and out of tight places at relatively high speeds [41].

The Future of Control Systems



The Honda P3 humanoid robot. P3 walks, climbs stairs and turns corners.
Photo courtesy of American Honda Motor, Inc.

The Future of Control Systems



Future evolution of control systems and robotics.