

Computer control

In a conventional control loop all the signals are continuous function of time , as shown in figure .(pneumatic control loops employ air pressure for signal transmission , where as the electronic control loop use voltage or current signals .

A computer _based control system is an example of a sampled- data system . The controlled variable is measured as before and the continuous electrical signal, which represents the controlled variable , is fed to a device called an analog – to – digital converter , where is it sampled at a predetermined frequency . The value of the discrete signals thus produced is then compared with the discrete form of the set point in the digital computer to produce an error . An appropriate computer program representing the controller , called a control algorithm , is executed which yields a discrete controller output . This discrete signal is then converted into continuous electrical signal by means of a device called a digital –to – analog converter and the signal is then fed to the final control element .

$$\{f(t)\} = f(s) = \int_0^{\infty} f(t)e^{-st} dt$$

$f(t)$:continuous function

$f^*(t)$: sampled function

$$f^*(s) |_{Z=e^{Ts}} = \sum_{n=0}^{\infty} f(nT)Z^{-n} \quad Z - \text{transform of } f(t)$$

$$F(Z) = Z\{f(t)\} = f^*(s) |_{Z=e^{-st}} = \sum_{n=0}^{\infty} f(nT)Z^{-n}$$

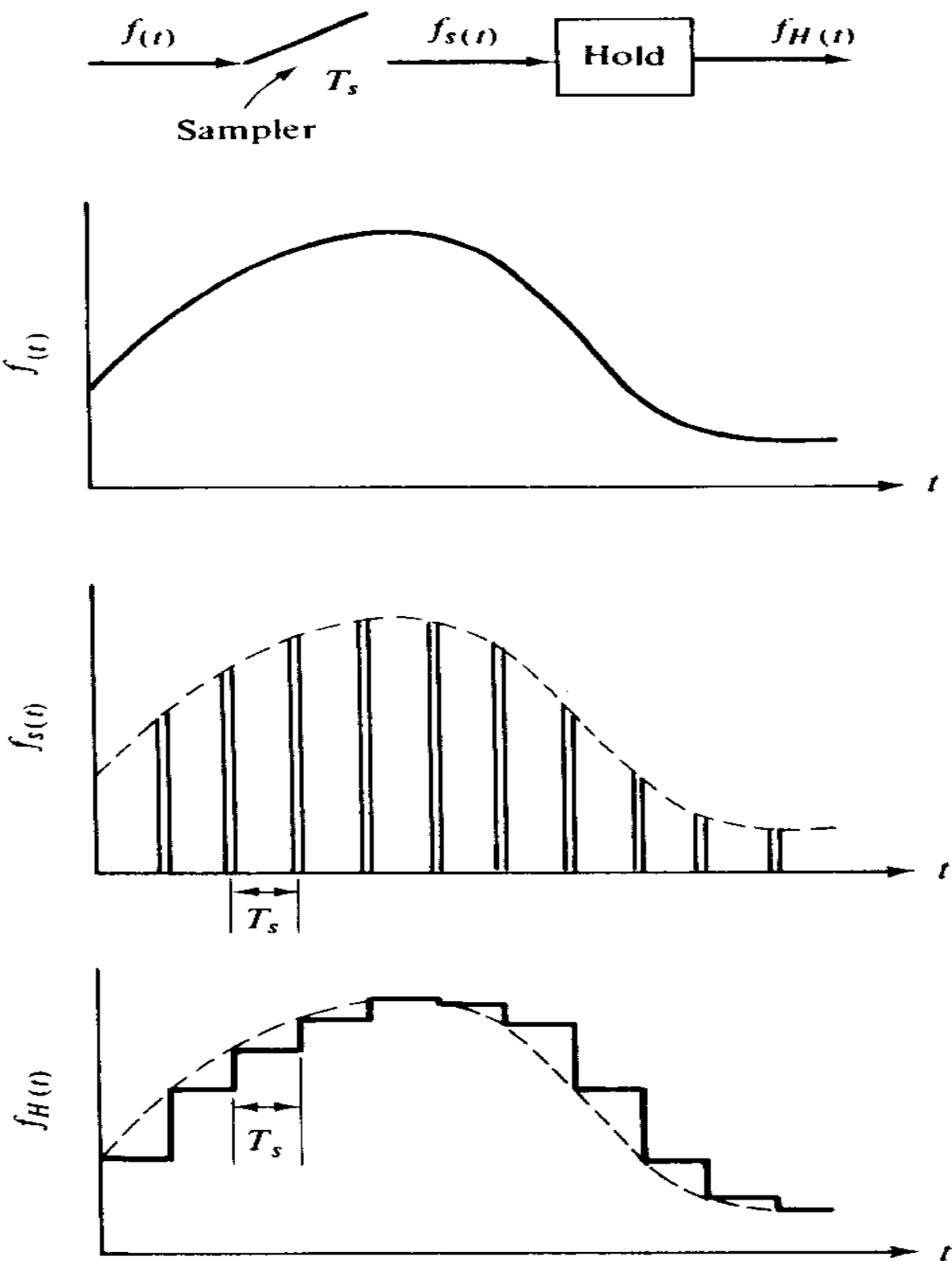


Fig.

62 Sampled signals