

## Signal Transformations

In these tasks we are doing signal transformation using the MATLAB i.e., **time reversal and reflection** in which a signal  $y(t)$  is a reflection or a reflected version of  $x(t)$  about the interval axis if  $y(t) = x(-t)$ . In

**time scaling** a signal  $x_1(t)$  is a compressed version of  $x(t)$  it  $x_1(t) = x(at), a > 1$ . The time compression practically means that the time duration of the signal is reduced by a factor of  $a$ . On the other hand, a signal  $x_2(t)$  is an expanded version of  $x(t)$  it  $x_2(t) = x(at), 0 < a < 1$ . In **time shifting** a signal  $y(t)$  is a time shifted version of  $x(t)$  if  $y(t) = x(t - t_0)$ , where  $t_0$  is the time shift. If  $t_0 > 0$ , the signal

$y(t) = x(t - t_0)$  is shifted by  $t_0$  units to the right while if  $t_0 < 0$ , the signal  $y(t) = x(t - t_0)$  is shifted by  $t_0$  units to the left. Then we've seen transformation of time variable for discrete-time signals in which we've seen a new term **down sampling** operation results in time compression of the signal.