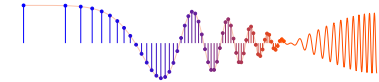


EXERCISE 5.10: Show that the time-flip system $y[n] = x[-n]$ is a linear system.



SOLUTION



Define $\text{FLIP}\{x[n]\} = x[-n]$

Scaling: $\text{FLIP}\{\alpha x[n]\} = \alpha x[-n]$

That is, "doubling $x[n]$ " will double its flipped version

Additive:

$$\begin{aligned}\text{FLIP}\{x_1[n] + x_2[n]\} &= x_1[-n] + x_2[-n] \\ &= \text{FLIP}\{x_1[n]\} + \text{FLIP}\{x_2[n]\}\end{aligned}$$