

Example 10-2: For the system in (??) with $a_1 = 0.8$ and $b_0 = 5$, the impulse response is

$$h[n] = 5(0.8)^n u[n] = \begin{cases} 5(0.8)^n & \text{for } n \geq 0 \\ 0 & \text{for } n < 0 \end{cases} \quad (10.2)$$

This impulse response is nonzero for $0 \leq n < \infty$ (i.e., it has infinite duration), which is what we mean by the designation IIR.

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