

# Transmission: Digital vs. Analog

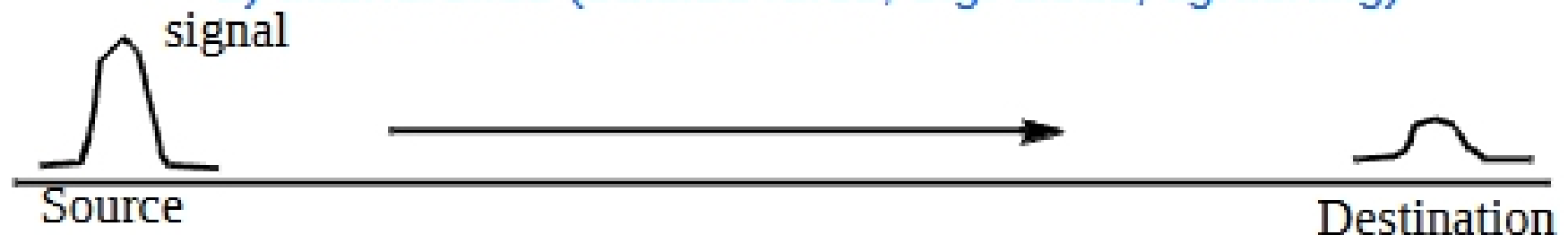
Problem 1: Transmit information "faithfully" (with little or no distortion) to the receiver

Reality: signal got distorted over distance

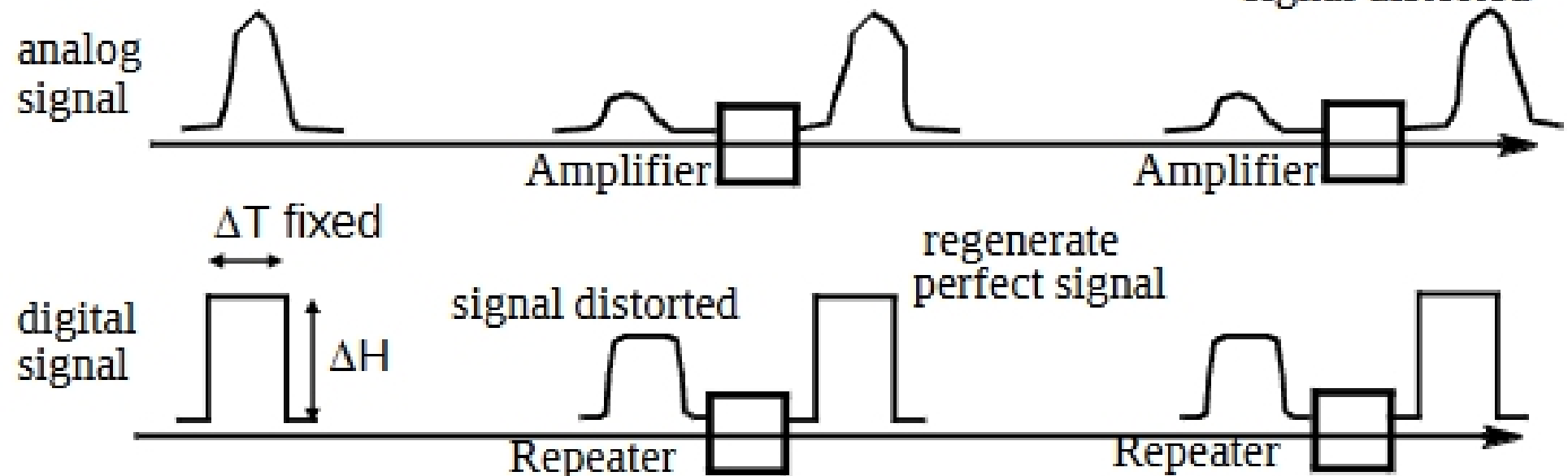
because

1) impedance (within transmission medium)

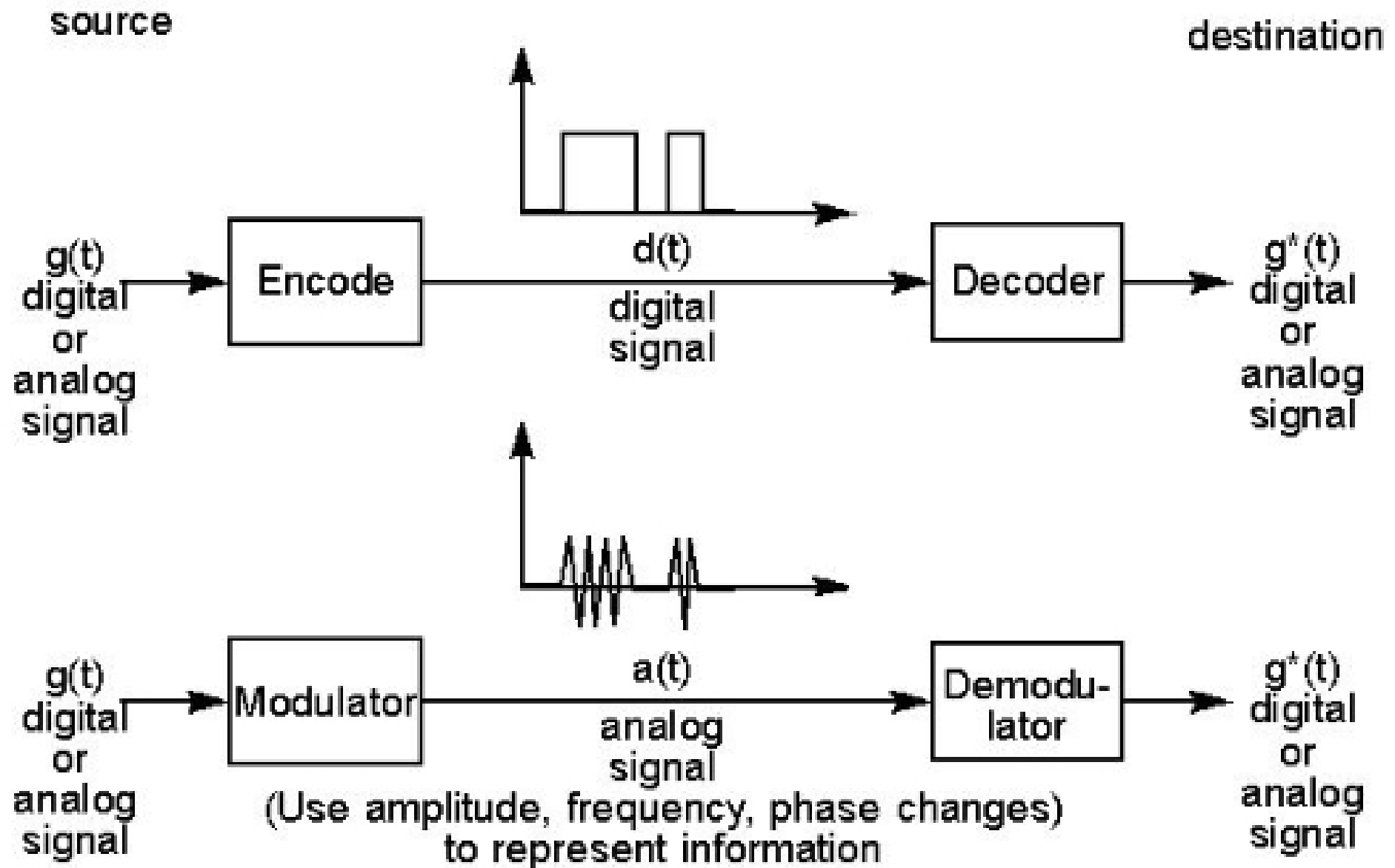
2) interference (outside force, e.g. cloud, lightning)



Solutions:



# Data Encoding and Modulation



# Amplitude, Frequency, and Phase of a Signal

$$s(t) = A \sin(2\pi ft + \theta) \quad \text{Amplitude} = A; \quad \text{Frequency} = f; \quad \text{Phase} = \theta$$

