

ECE 447

Fall 2025

Lesson 19

Pulse Code

Modulation



UNITED STATES
AIR FORCE
ACADEMY

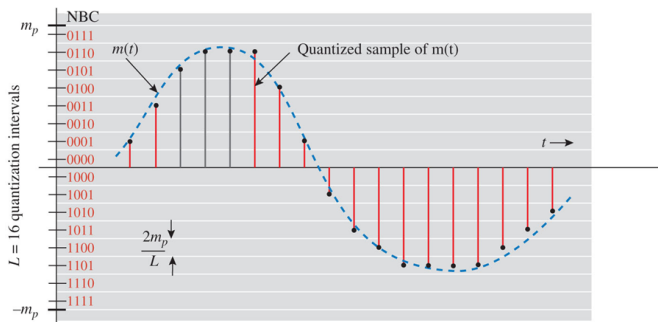
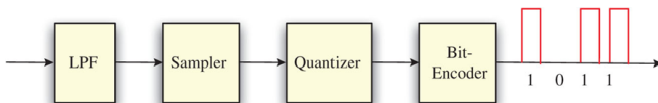
SCHEDULE AND ADMIN

- [Schedule](#)
- Admin
 - **HW3.** Posted on course website. Due Lesson 20 (1 Oct). Not on Prog grade.
 - **GR1 Grades.** Added a 5pt "curve" to everyone's grade in Blackboard.
 - Everything for Prog is graded and in Blackboard
 - Still need to subtract a few late penalties...
 - Submit any regrade requests before COB 1 Oct

EXAMPLE PROBLEM - 5.1-7

SAMPLING COMPUTER EXAMPLE

PULSE CODE MODULATION



QUANTIZATION ERROR AND SNR

$$\begin{aligned}\left(\frac{S_o}{N_o}\right)_{\text{dB}} &= 10 \log_{10} \left(\frac{S_o}{N_o}\right) \\ &= 10 \log_{10} [c(2)^{2n}] \\ &= 10 \log_{10} c + 2n \log_{10} 2 \\ &= (\alpha + 6n) \text{ dB}\end{aligned}$$

PCM COMPUTER EXAMPLE