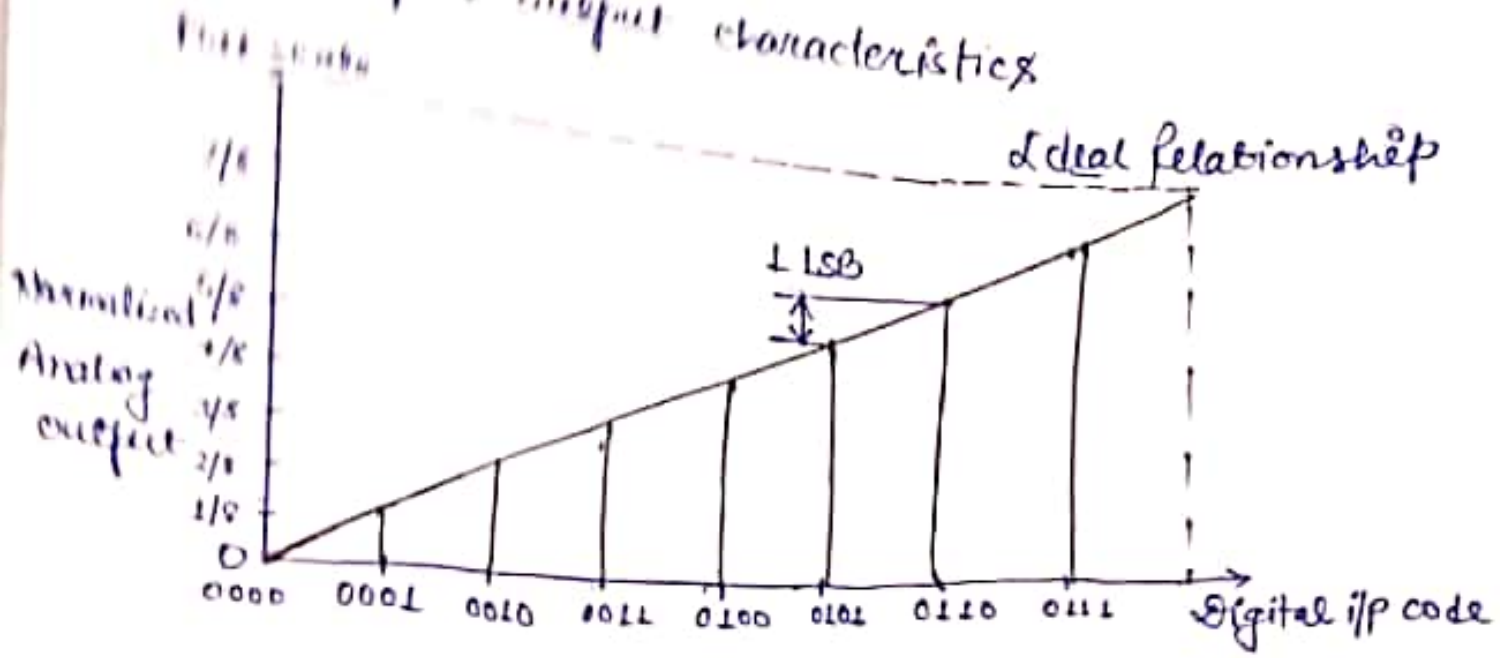
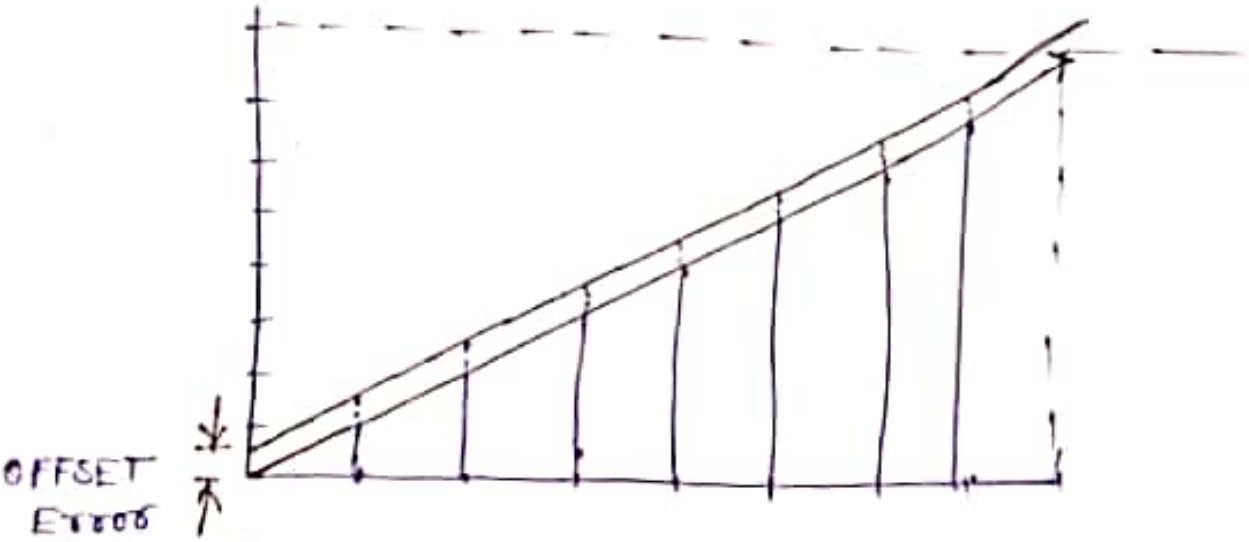
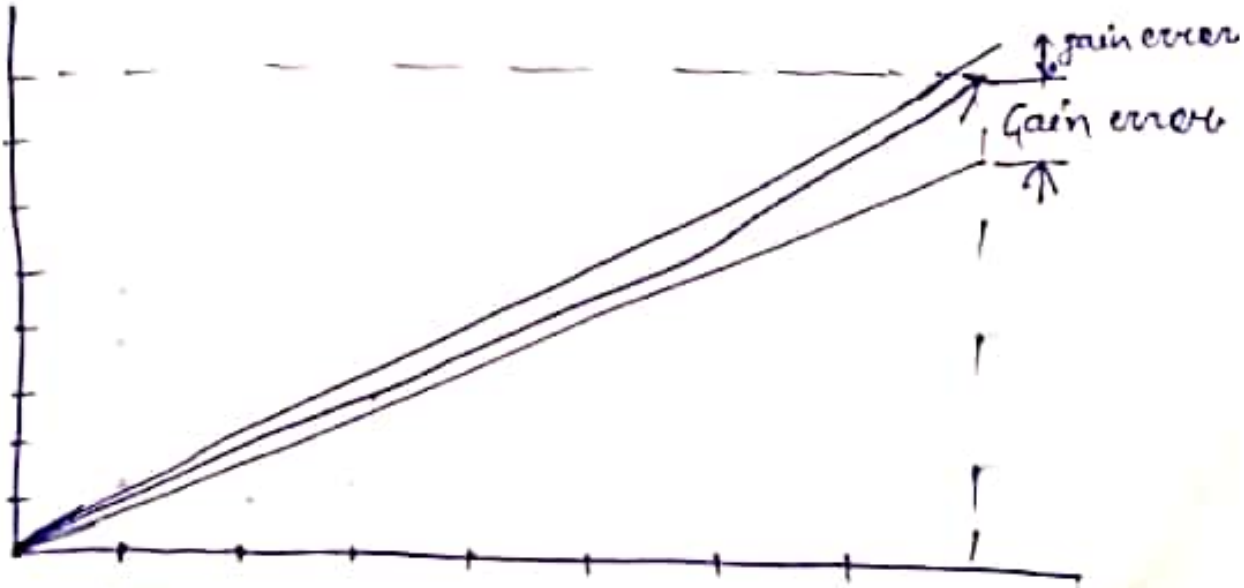
Output Input Relationship of DAC.

Input output characteristics







(Transfer function of DAC)

The output of DACs are used to drive a variety of devices

Ex — Loudspeaker, Video display, motor controller, mechanical servo, radio frequency transmitter & temperature Control etc.

A DAC produces a quantized (discrete step) analog output in response to a binary digital input code

the transfer function for an 3-bit DAC is shown in previous page.

The digital input may be

TTL (Transistor - transistor logic)
ECL (Emitter coupled logic)
CMOS (Complementary Metal-oxide semiconductor)
or
LVDS (Low voltage differential signaling)

while analog output may be either voltage or current

To generate the output, a reference quantity (either a voltage or a current) is devided into binary and/or linear fraction.

Then the digital input drives switches that combine an appropriate number of these fraction to produce the output

the analog output of DAC is;

$$A_0 = \frac{D_i}{2^N} R_{ef}$$

Where A_0 = Analog output

D_i = Digital input code

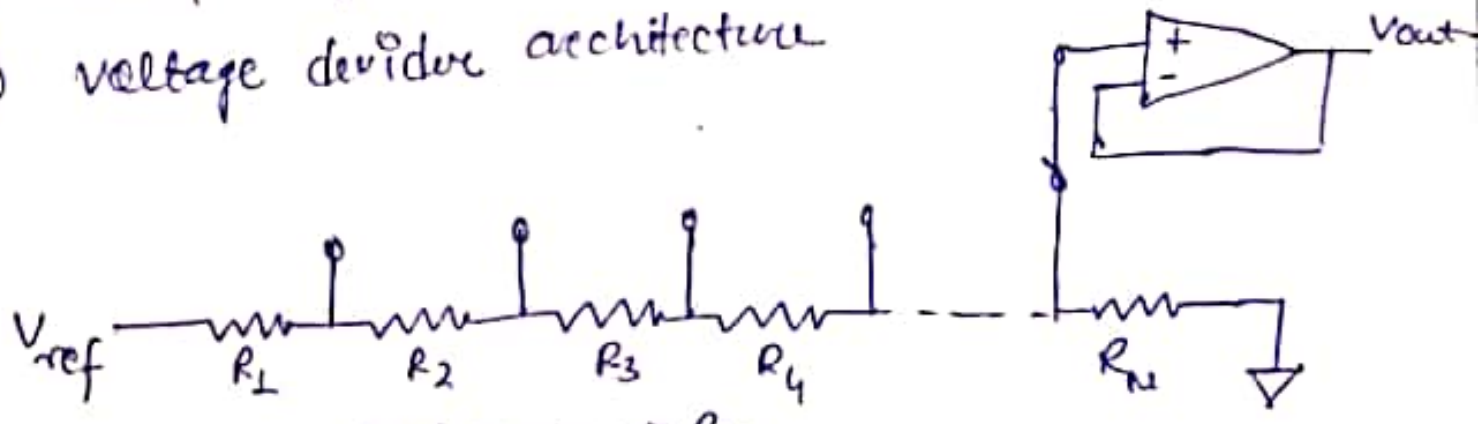
N = nuber of number of digital input bits

also, 2^N = Resolution

Ref = Reference value (at full scale)

Common D/A Architecture

1. Binary weighted architecture
2. voltage devider architecture



e $R_1 = R_2 = \cdots = R_N$