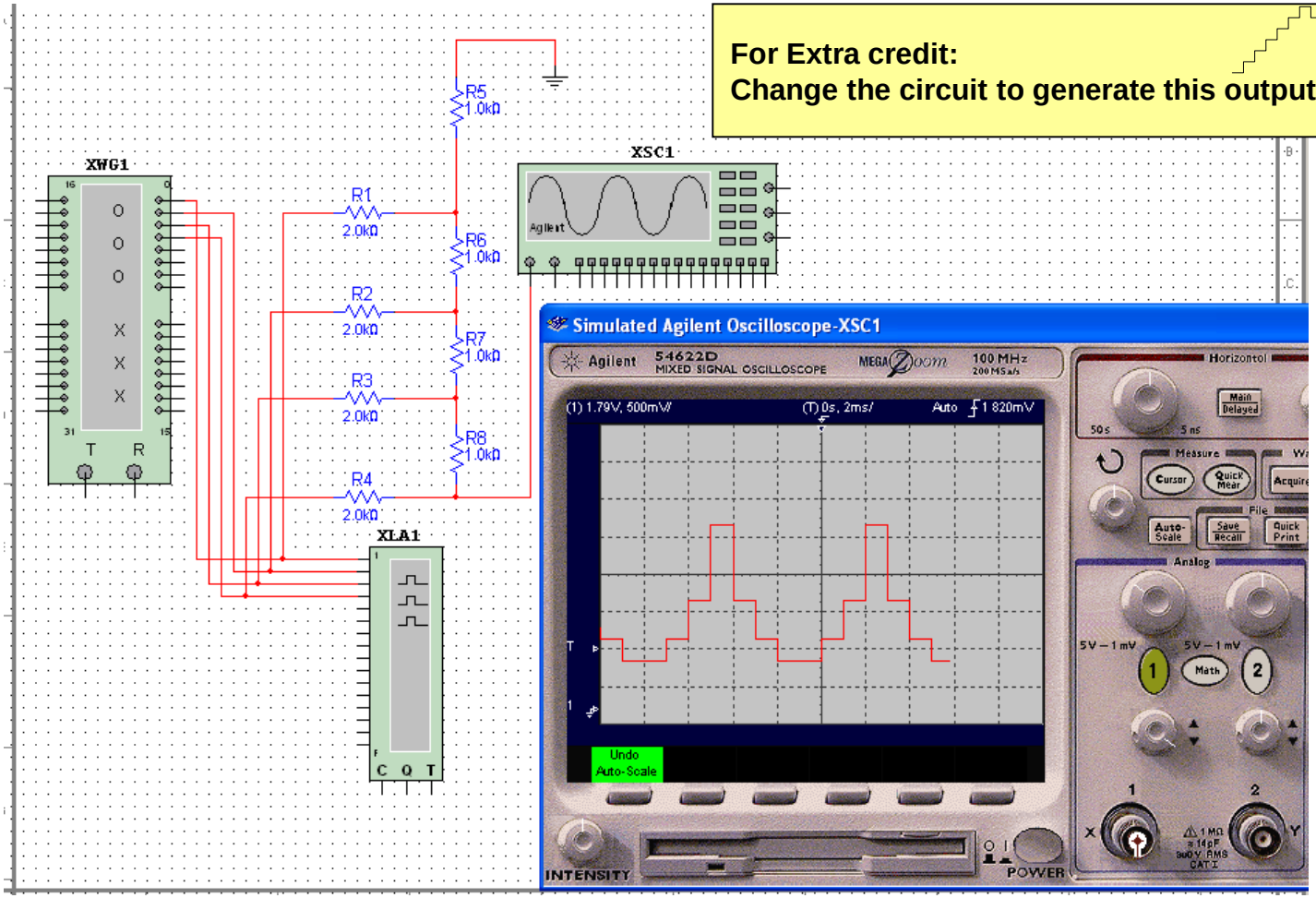
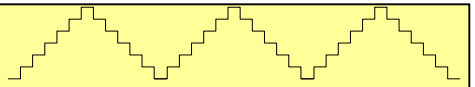
FACULTY OF ENGINEERING & TECHNOLOGY

Dileep Kumar
Assistant Prof. EE Deptt

Examining Digital-to-Analog Conversion

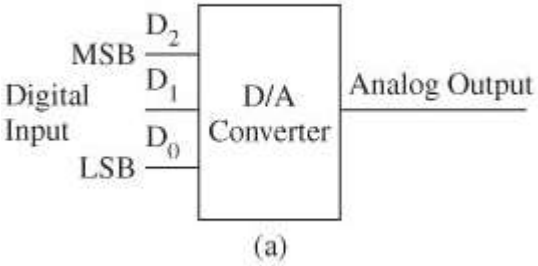


For Extra credit:
Change the circuit to generate this output:

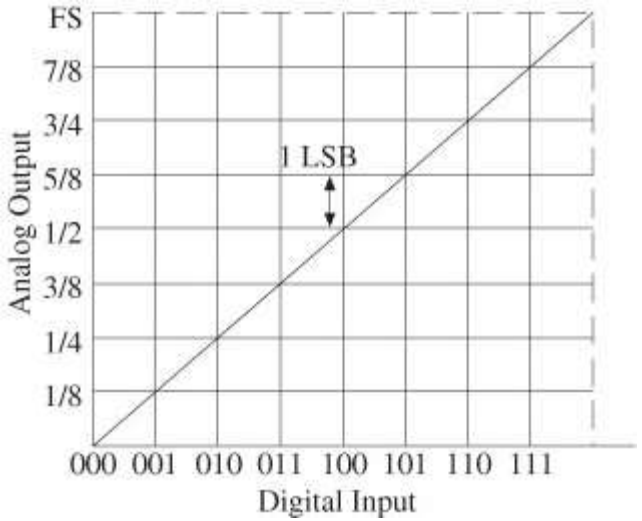


Digital to Analog Conversion

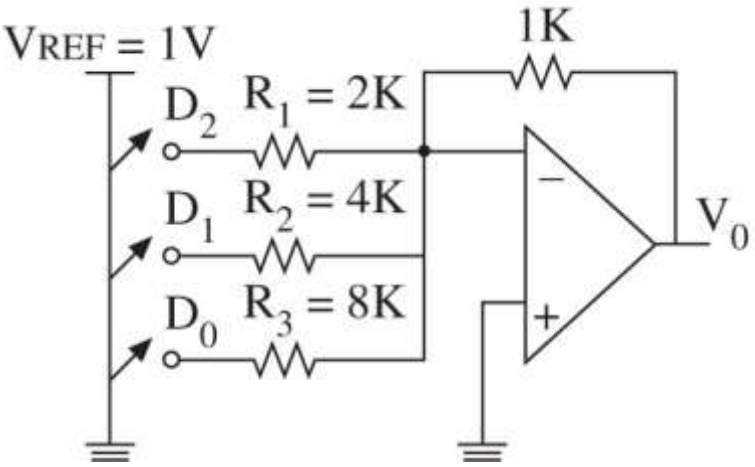
- The resolution of a DAC is defined in terms of bits—the same way as in ADC.
- The values of LSB, MSB, and full-scale voltages calculated the same way as in the ADC.
- The largest input signal 111 is equivalent of 7/8 of the full-scale analog value.
- Can be designed using an operational amplifier and appropriate combination of resistors
- Resistors connected to data bits are in binary weighted proportion, and each is twice the value of the previous one.
- Each input signal can be connected to the op amp by turning on its switch to the reference voltage that represents logic 1.
  - If the switch is off, the input signal is logic 0.



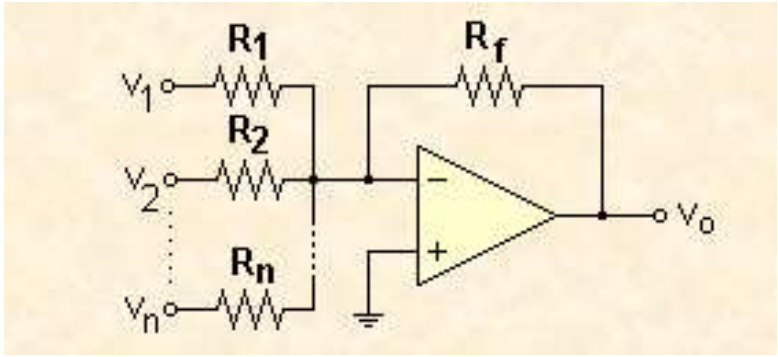
(a)



3-bit D/A Converter Circuit



Summing amplifier



- The transfer function of the summing amplifier :

vo = -(v1/R1 + v2/R2 + … + vn/Rn)Rf

- Thus if all input resistors are equal, the output is a scaled sum of all inputs.
- If they are different, the output is a weighted linear sum of all inputs.

R/2R Ladder Network for D/A Converter