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Topic - D/A converter

DATE

D/A converters

Digital to analog converter (D/A converter)

These converters produce an analog output for a given digital input. There are two types of D/A converters:

- (i) Weighted-resistor D/A converter, and
- (ii) R-2R ladder D/A converter.

(i) Weighted Resistor Type: - In it resistance values are weighted in accordance with binary weights (fig 1; where resistance connected to 2^3 binary weight is $\frac{R}{2^3}$ etc.) with

each binary bit, a switch (an electronic) is associated which is closed if the bit is a 1 and open if it is a 0. These logic voltages which represent the individual bits are not applied directly to the converter but are used to operate these electronic switches. In series with these switches weighted resistors are connected. A precise reference voltage line (V_R) is also connected as shown.

When any bit is a 1, corresponding switch is closed and corresponding resistor is connected to V_R . The binary number (the digital input) to be converted

(held in a resistor) is applied to the switches, so that a current I , proportional to the binary number (due to weighted resistors) is given out by the arrangement (of fig 1). This current is converted into output voltage through OP-AMP (being used as current to voltage converter). Thus output voltage is proportional to binary number. As the number gets updated periodically, the output voltage will vary as shown in fig. It is then passed through a low pass filter to smooth out the abrupt transitions, giving continuous analog signals.

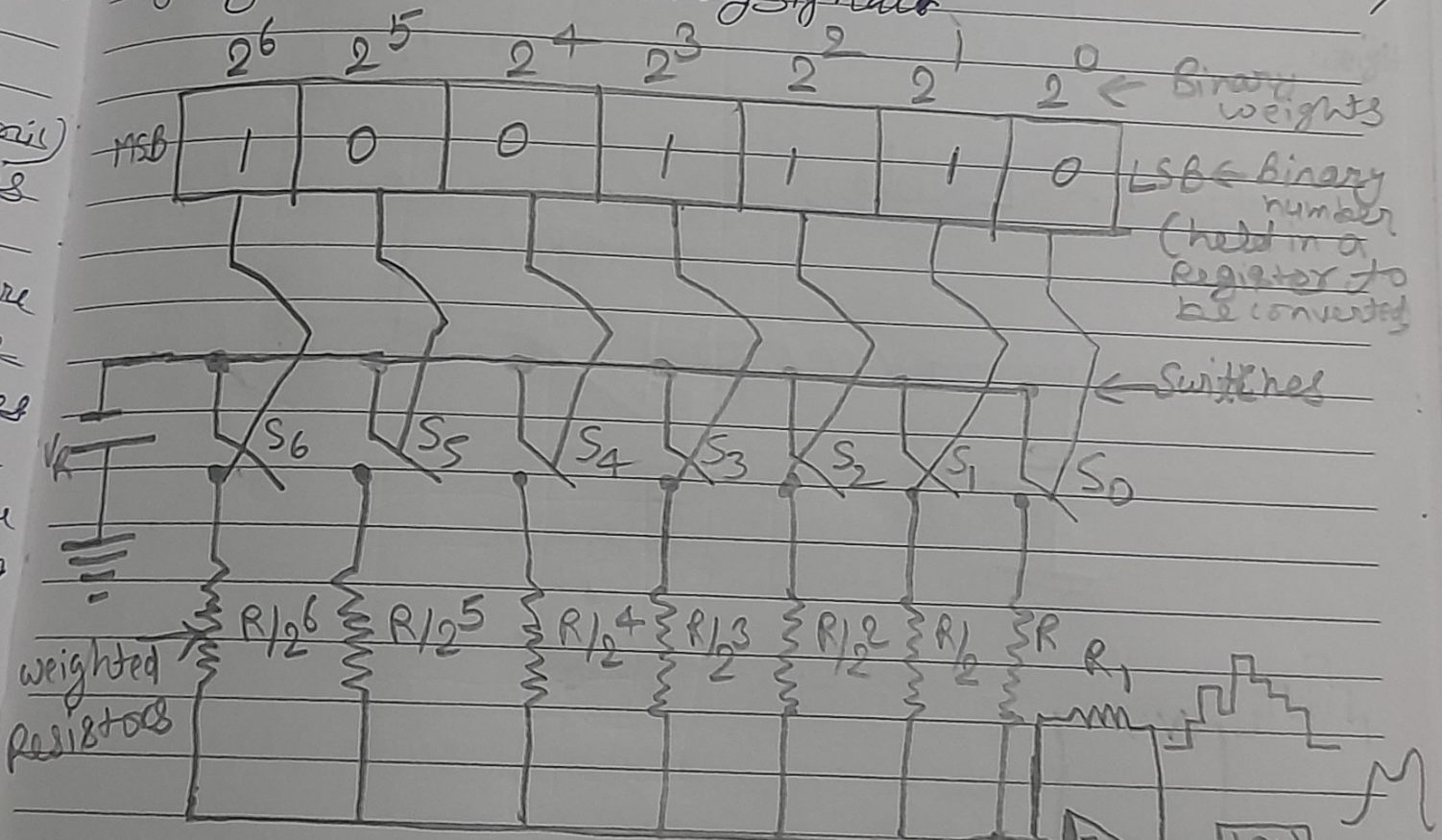


fig 1 weighted Resistor D/A converter.