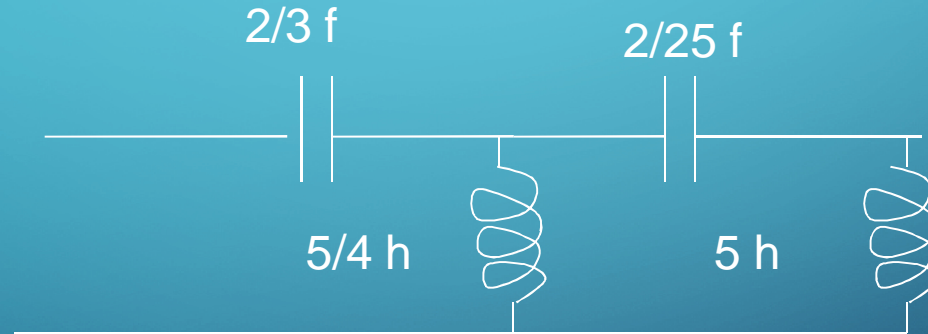# NETWORK THEORY

LECTURE 6

SECTION-D :NETWORK SYNTHESIS

- This circuit (Ladder) called as Cauer

   because Cauer discovered the continues fraction method.

- Without going into the proof of the statement m in can be said that both the Foster and Cauer form gice the minimum number of elements for a specified L-C network.

EXAMPLE OF CAUER METHOD

$$Z(s) = \frac{(s^2+1)(s^2+3)}{s(s^2+2)}$$

ACTIVE NETWORK SYNTHESIS

- An operational amplifier, commonly called Op-Amp, is a three stage circuit namely, the input stage, gain stage and output stage and which is fabricated as an integrated circuit. The IC 741 is a widely used all-bipolar general purpose Op-Amp.
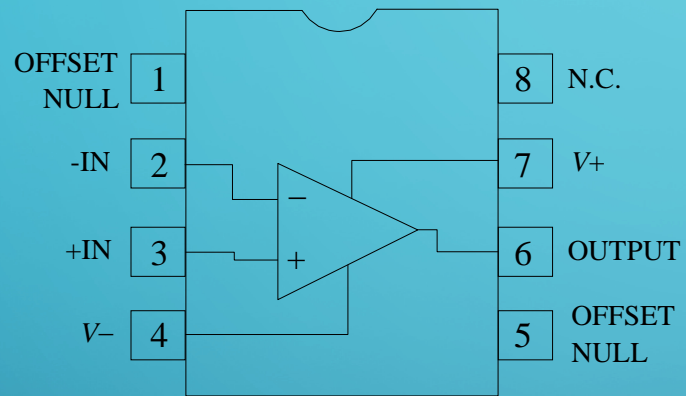
OPERATIONAL AMPLIFIER (OP-AMP)

- Very high differential gain
- High input impedance
- Low output impedance
- Provide voltage changes (amplitude and polarity)
- Used in oscillator, filter and instrumentation
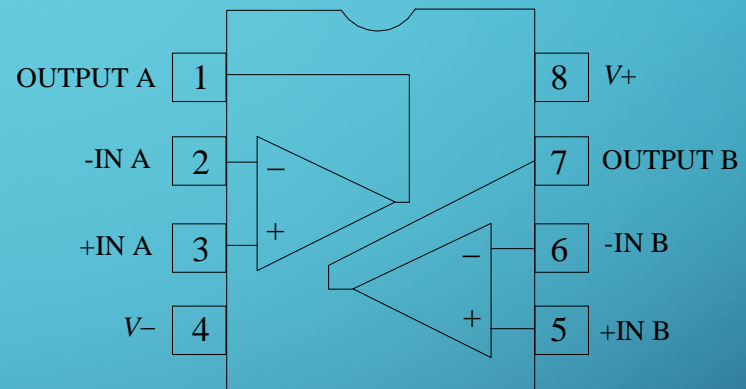- Accumulate a very high gain by multiple stages

$+V_{cc}$

Input 1

$+$

V_d

V_o

$-$

Output

Input 2

$R_{in} \sim inf$ $-V_{cc}$ $R_{out} \sim 0$
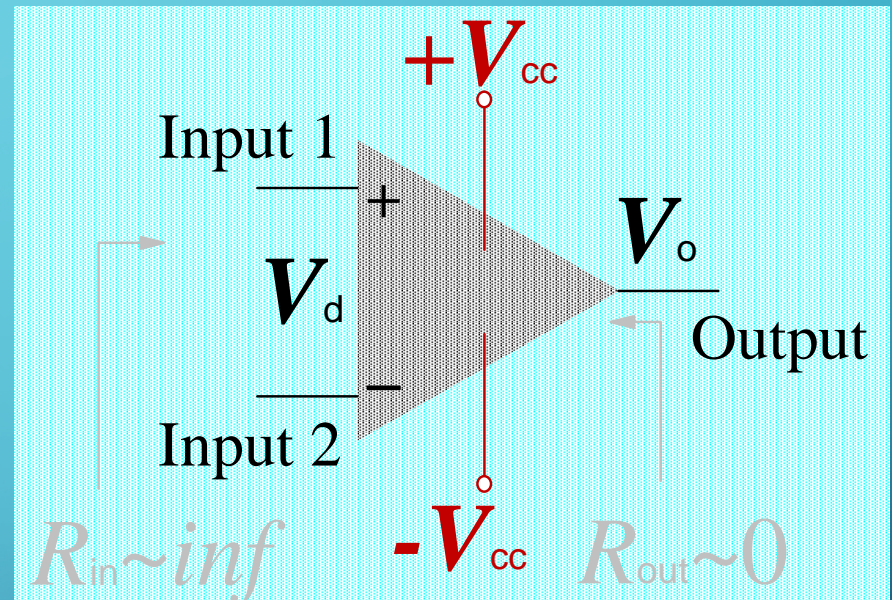
$$V_o = G_d V_d$$

$$G_d : \text{differential gain normally}$$
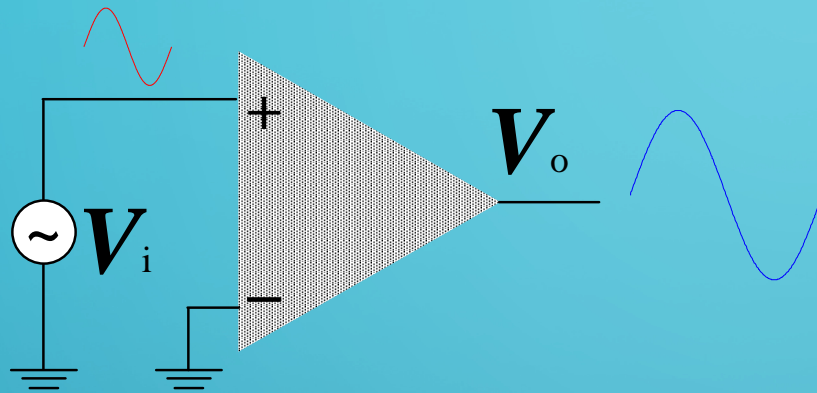$$\text{very large, say } 10^5$$
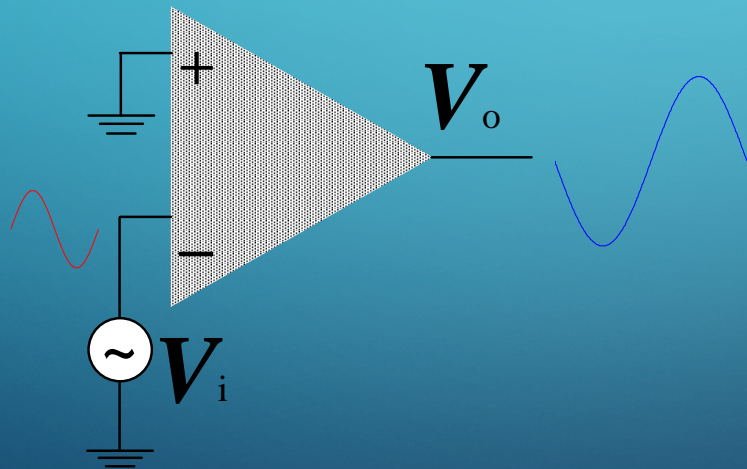
IC PRODUCT

DIP-741

Dual op-amp 1458 device

SINGLE-ENDED INPUT

V_o

- + terminal : Source
- − terminal : Ground
- 0° phase change

V_o

- + terminal : Ground
- − terminal : Source
- 180° phase change