

UNIT-4 >>CURRENT MIRROR AND OP-AMP DESIGN

SUBJECT-ANALOG CIRCUITS

PAPER CODE-402

LECTURE-NO>>4

TOPIC>> ICMR

FACULTY NAME>>DR.NIDHI CHAUHAN

INPUT COMMON MODE RANGE (ICMR) OF MOS DIFFERENTIAL AMPLIFIER.

- ICMR is the range of V_{CM} over which the differential pair operates properly.
- The highest value of V_{CM} is limited by the requirement that Q_1 and Q_2 remain in saturation, thus

$$V_{CM\ max} = V_t + V_{DD} - I/2 R_D$$

The lowest value of v_{cm} is determined by the need to allow for a sufficient voltage

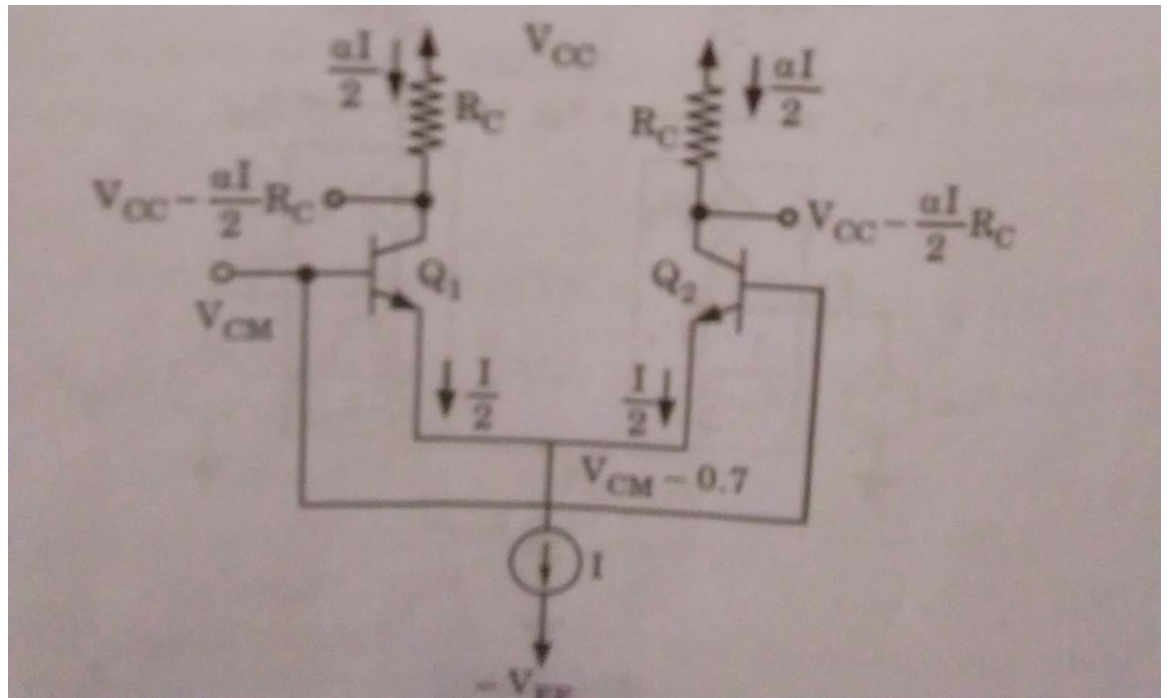
across current source / for it to operate properly.

If a voltage V_{CS} is needed across the current source, then

$$V_{CM\ min} = -V_{SS} + V_{CS} + V_t + V_{OV}$$

INPUT COMMON-MODE RANGE (ICMR) OF BJT DIFFERENTIAL AMPLIFIER

- The allowable range of V_{CM} is determined at the upper end by Q_1 and Q_2 leaving the active mode and entering saturation.



- Thus,

$$V_{CM\ max} = V_C + 0.4 = V_{CC} - a I/2 R_C + 0.4$$

- The lower end of the V_{CM} range is determined by the need to provide a certain minimum voltage V_{CS} across the current source I ensure its proper operation.

- Thus,

$$V_{CM\ min} = -V_{EE} + V_{CS} + V_{BE}$$

