

## EE23BTECH11217 - Prajwal M\*

EE 16

The steady state output  $V_{out}$  of the circuit shown below, will

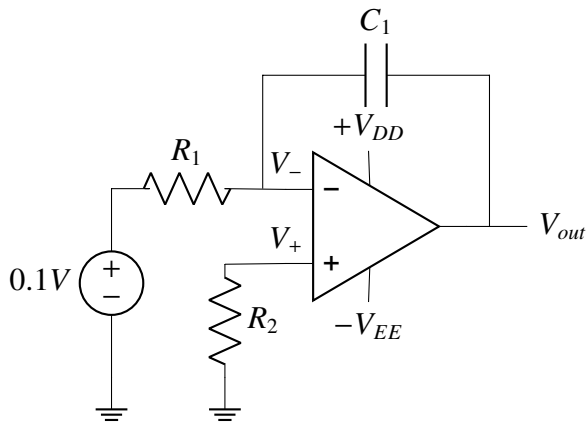


Fig. 0. circuit

- 1) saturate to  $+V_{DD}$
- 2) saturate to  $-V_{EE}$
- 3) become equal to  $0.1V$
- 4) become equal to  $-0.1V$

Solution:

$$\frac{V_- - 0.1}{R_1} + C_1 \frac{d(V_- - V_{out})}{dt} = 0 \quad (1)$$

$$\frac{d(V_{out})}{dt} = -\frac{1}{R_1 C_1} \quad (2)$$

$$V_{out} = -\frac{1}{R_1 C_1} t \quad (3)$$

$$V_{out} = \max \left\{ -V_{EE}, -\frac{1}{R_1 C_1} t \right\} \quad (4)$$

$$(5)$$

for  $t > V_{EE} R_1 C_1$ ,  $V_{out}$  saturates to  $-V_{EE}$