ELECTRONIC CIRCUITS

LAB. NO.6

NON-INVERTING & INVERTING AMPLIFIERS (OPAMP)

1. NON-INVERTING AMPLIFIER

\[ +V = +15\text{VDC}, \quad -V = -15\text{VDC} \]

FILM RESISTORS

\[ \text{VIN LAG 120} \quad 500\text{HZ} \]

1.1 CLOSED LOOP GAIN:

NOTE: LM741 IS USED IN THIS PROCEDURE, LF351 CAN ALSO BE USED

1. VIN = 400 mVp-p, MEASURE VIN, VOUT, VRi, VRf (DIFF MODE)
   FIND PHASE OF: VOUT WRT VIN, VRi WRT VIN (SKETCH WAVE SHAPES)
2. CALCULATE ACL = 1+Rf/Ri, ACL = VOUT/VIN, * IF, ii, IL, IOUT
3. FIND VIN FOR DISTORTION OF VOUT MEASURE AND SKETCH WAVE SHAPES
4. REPEAT 1,2,3 (OMIT WAVEFORM SKETCHES) FOR RF = 10K
5. REPEAT 1,2 AND 3 (OMIT WAVEFORM SKETCHES) FOR RF=49.9K
6. FIND VIN FOR DISTORTION OF VOUT FOR RF=4.99K,10K, 4.99K WHEN
   \(+V=+12\text{VDC}, \quad -V=-12\text{VDC}. \) MEASURE VIN & VOUT
7. *CALCULATE:
   1. VOUT = VRf+VRi FOR RF=4.99K, 10K AND 49.9K (RI=1K)
   2. IF=ii=VOUT/(RF+RI)
   3. IOUT=VOUT/ RL// (RF+RI)

*DO CALCULATIONS AFTER ALL DATA IS ACQUIRED.
NON-INVERTING AMPLIFIER

1.2 FREQUENCY RESPONSE:

1. REMOVE POWER, REPLACE LF351 WITH LM741.
   SET +V TO +15VDC, -V TO -15VDC. FOR RE = 100K
   SET VIN = 200 mVpp @ 500HZ. CALCULATE
   1. Acl = Vout/VIN   2. Acl = 1+Rp/Rf, USE LEADER
   LCD-822 (DIGITAL COUNTER) TO MEASURE
   FREQUENCY. USE CRO TO MEASURE VIN & VOUT.

2. FOR VIN = 200 mVpp (NO PEAK DISTORTION IN VOUT).
   MEASURE VOUT AT f = 1, 3, 5, 6, 7, 8, 9, 10, 12, 15, 20, 30, 40, 50 KHz

3. CALCULATE Acl = Vout/Vin AT ALL FREQUENCIES

4. CALCULATE THE GAIN-BANDWIDTH
   PRODUCT - GBWP; THE UPPER CUT-OFF FREQUENCY
   f2, AND THE AMPLIFIER BANDWIDTH.
NON-INVERTING & INVERTING AMPLIFIERS (OPAMP)

2. INVERTING AMPLIFIER

\[ +V = +15\text{VDC} \]
\[ -V = -15\text{VDC} \]

1. VIN = 400mVp-p, MEASURE VIN, VOUT, VRF (DIFF MODE), VRI (DIFF MODE). FIND PHASE OF: VOUT WRT VIN & SKETCH

2. CALCULATE ACL = \(-RF/RI\), ACL = VOUT/ VIN, li, IF, IL, IOUT

3. FIND VIN FOR DISTORTION OF VOUT, MEASURE VIN & VOUT.

4. REPEAT 1, 2, 3, (OMIT SKETCH) RF=100K \& 500K (TWO 1MEG IN PARALLEL)

5. FIND VIN FOR DISTORTION OF VOUT FOR RF=500K WHEN +V=12VDC, -V=−12VDC. MEASURE VIN & VOUT