EEE - 313 Electronic Circuit Design
Lab - 4

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Section - 2
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EXPERIMENTAL REPORT

1) Introduction

A two-stage amplifier with feedback was requested to achieve a low output impedance and a flat gain design. Double bjt design was preferred.

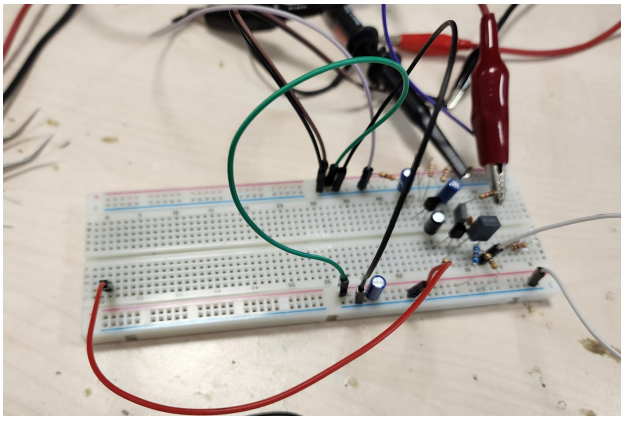

Fig. 1: Implemented

2) Experiment and criteria

2.1) The current consumpon is less than 70mA

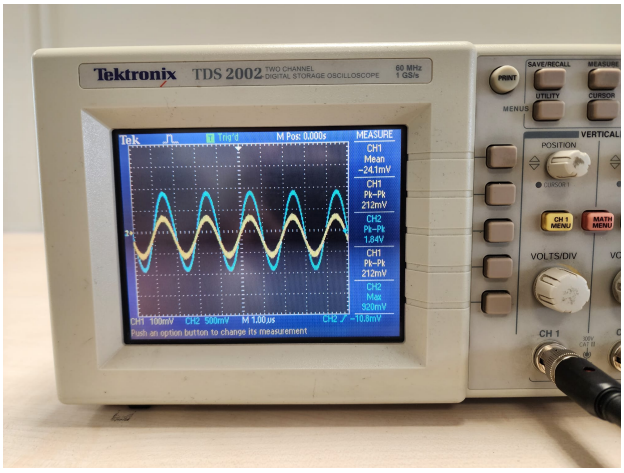

Fig. 2: Input and Output Voltage At 500KHz

Fig. 3: Input Signal and Vcc spesifications

As can be seen that, the input current is below 0.7mA.

2.2) The small-signal bandwidth is at least 5KHz-5MHz while the mid-band gain is 20dB±0.5dB

500KHz is given in the criterion 1

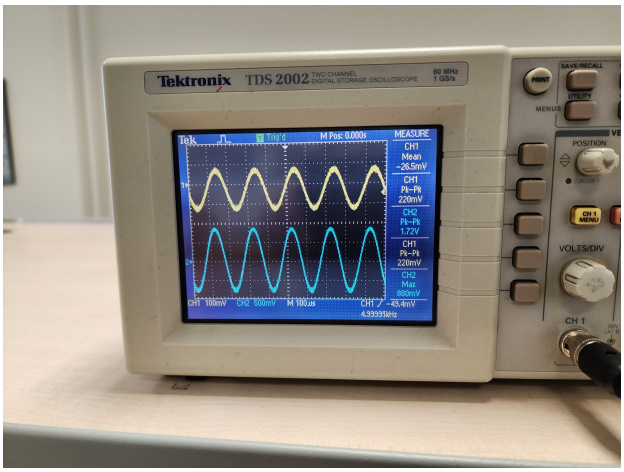

Fig. 4: Input and Output Voltage At 5KHz

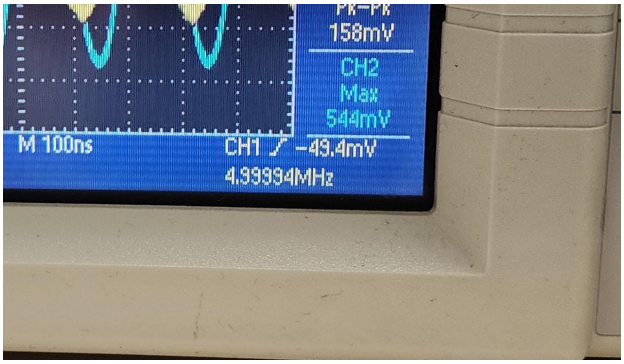

Fig. 5: 5KHz

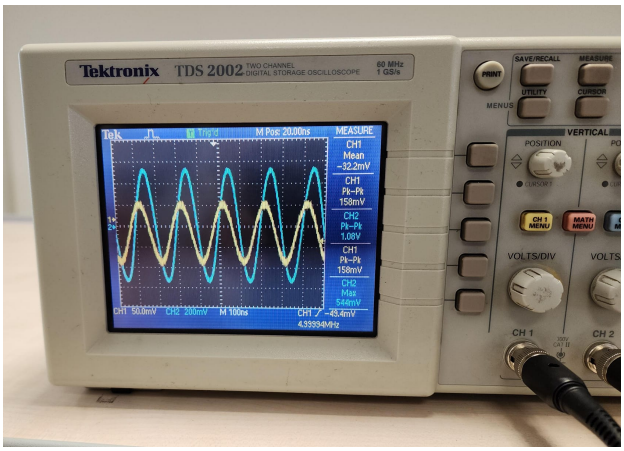

Fig. 6: Input and Output Voltage At 5MHz

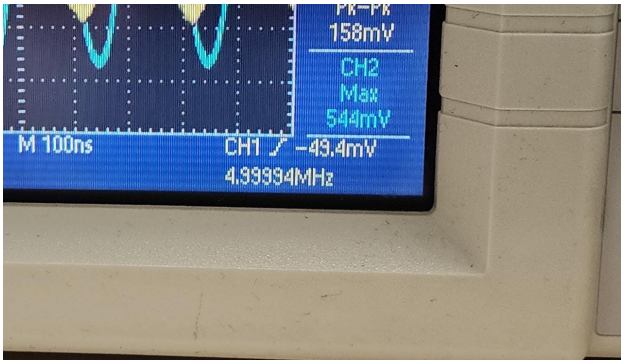

Fig. 7: 5MHz

Measured values meet the criteria.

2.3) The harmonic content of the output voltage is better than 30dBc with 0.1V peak input signal at 500KHz.

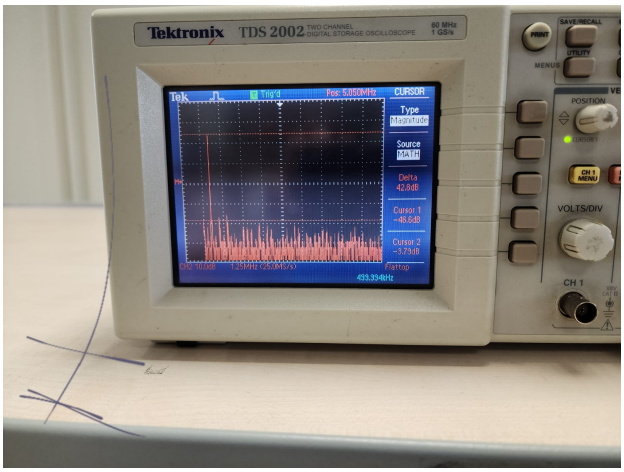

Fig. 8: Harmonics Calculation

It can seen that, harmonic delta is about 42 which is better than 30.

2.4) The small-signal input impedance of the amplifier at 500KHz

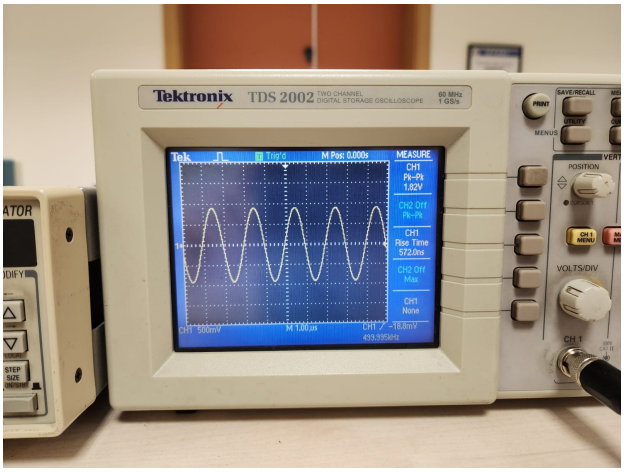

Fig. 9: Output Voltage When $R_S = 0\Omega$

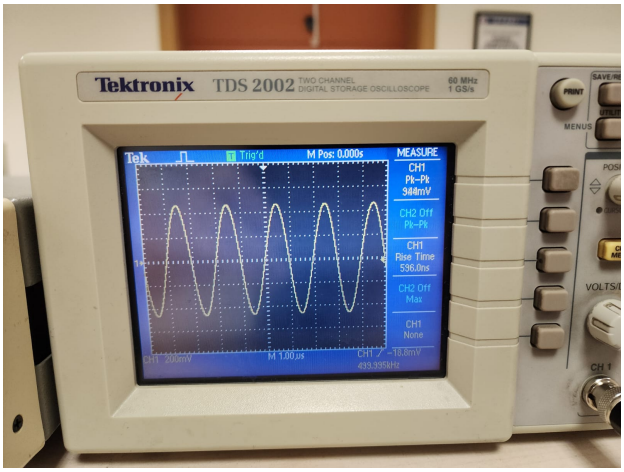

Fig. 10: Output Voltage When $R_S = 12k\Omega$

R_S was increased from 0Ω until the input empedance decreased by 6dB. The value to be found was between 11k and 13k. In 12kΩ, the graphics are as seen. When we look at the graphs, we see that the values are as expected.

2.5) The small-signal output impedance of the amplifier at 500KHz

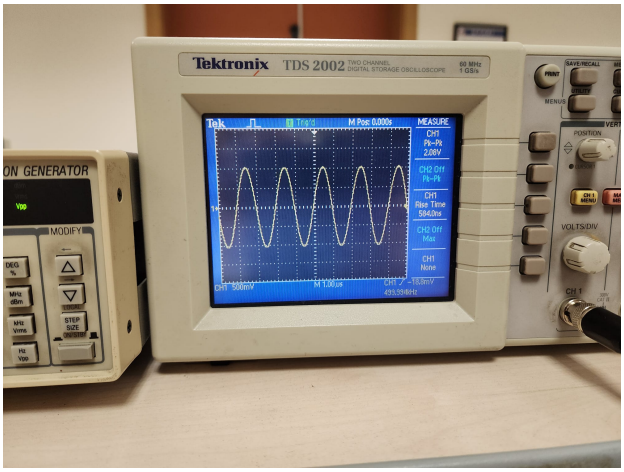

Fig. 11: Output Voltage When $R_L = \infty\Omega$

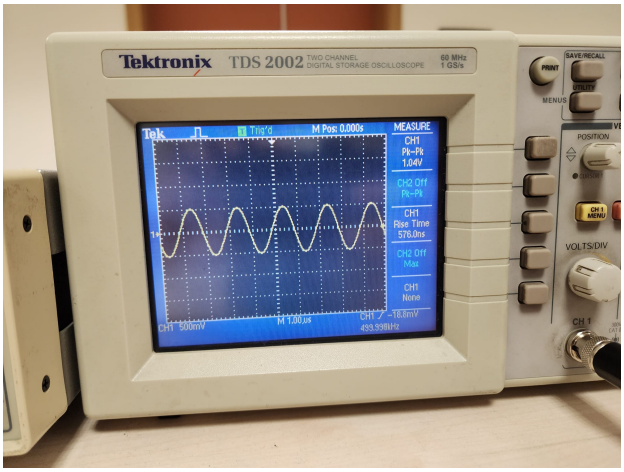

Fig. 12: Output Voltage When $R_L = 110\Omega$

R_L was decreased from $\infty\Omega$ until the input empedance decreased by 6dB. The value to be found was between and 100, with 120 being closer. In 110Ω, the graphics are as seen. When we look at the graphs, we see that the values are as expected

3) Conclusion

The values were selected from the experimental values, the circuit was implemented and the necessary criteria measurements were taken. The results came as expected. The experiment is successful.