EE230: Experiment 4
Analog multiplier

Name of student, Roll. no.

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1 Overview of the experiment

1.1 Aim of the experiment

In your own words, describe the aim of the experiment.

1.2 Methods

In your own words, describe how you set out to realize the goal of the experiment. Only 1 paragraph of a brief overview of your approach is expected here. Do not list your observations here.

2 Four quadrant multiplier

Draw the circuit diagram for the circuit you used, with pin numbers marked for the IC. Do not copy-paste from handout. The midsem and endsem exams will be open-report i.e. you will be allowed to refer to your reports during the exam (no handouts!) So it is in your best interest to have well-labeled circuit diagrams that will help you later.

Note down your test cases, and the results you observed. Attach any relevant photos of DSO screen here. Hint: use minipage instead of float if you are a stickler for alignment!

3 Squarer and square-rooter

Use same formatting as the section above. Answer the questions asked in handout.

3.1 Squarer

3.2 Multiplication of phase shifted signals

3.3 Square-rooter

3.4 True-RMS measurement

4 Amplitude modulation and demodulation

Use same formatting as section 2 (Four quadrant multiplier). Answer the questions asked in handout.

5 Questions for reflection

1. Read up on Gilbert cell mixers. On page 4 of the handout that shows block diagram of the MPY634, you would probably guess that one of the blocks includes a Gilbert cell. Which block is it? What function is the "Voltage reference and bias" block serving? i.e. what circuit element in the Gilbert cell do you think it controls?
Ans. Enter answer here. Do not copy!! The datasheet of MPY634 does not have the answer.

2. When you performed your experiments, did you notice any offset at the output? (You would not have noticed any offset if you did your experiments with the DSO in AC coupled mode). Did the offset change when you changed the input frequency? Do your observations tally with the feedthrough plots on page 4 of the MPY634 datasheet available on TI website? Write down your guess-timate.
Ans. Enter answer here.

3. Based on whatever you have learnt so far in both Analog and Digital courses, which technique is best for signal multiplication - analog or digital?

Explain your answer in your own words.
Ans. Enter answer here.