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IS/ENG04/036

Phase Locked Loop (PLL)

This is a control system that generates an output signal whose phase is related to the phase of an input signal. It includes its Loop. Its main purpose is to force the VCO to replicate, and track the freq & Phase of the input when in lock.

Application of PLL

1 Synchronization Purposes, in space Communications etc.
2 Demodulation of FSK
3 Demodulation of modems
4 " of FM
5 Recovery of small signals.

A PLL may be implemented as either analog or digital circuits.

Analog PLL elements.

- Phase detector
- Low Pass filter.
- Feed back path
- Voltage Controlled ossilator

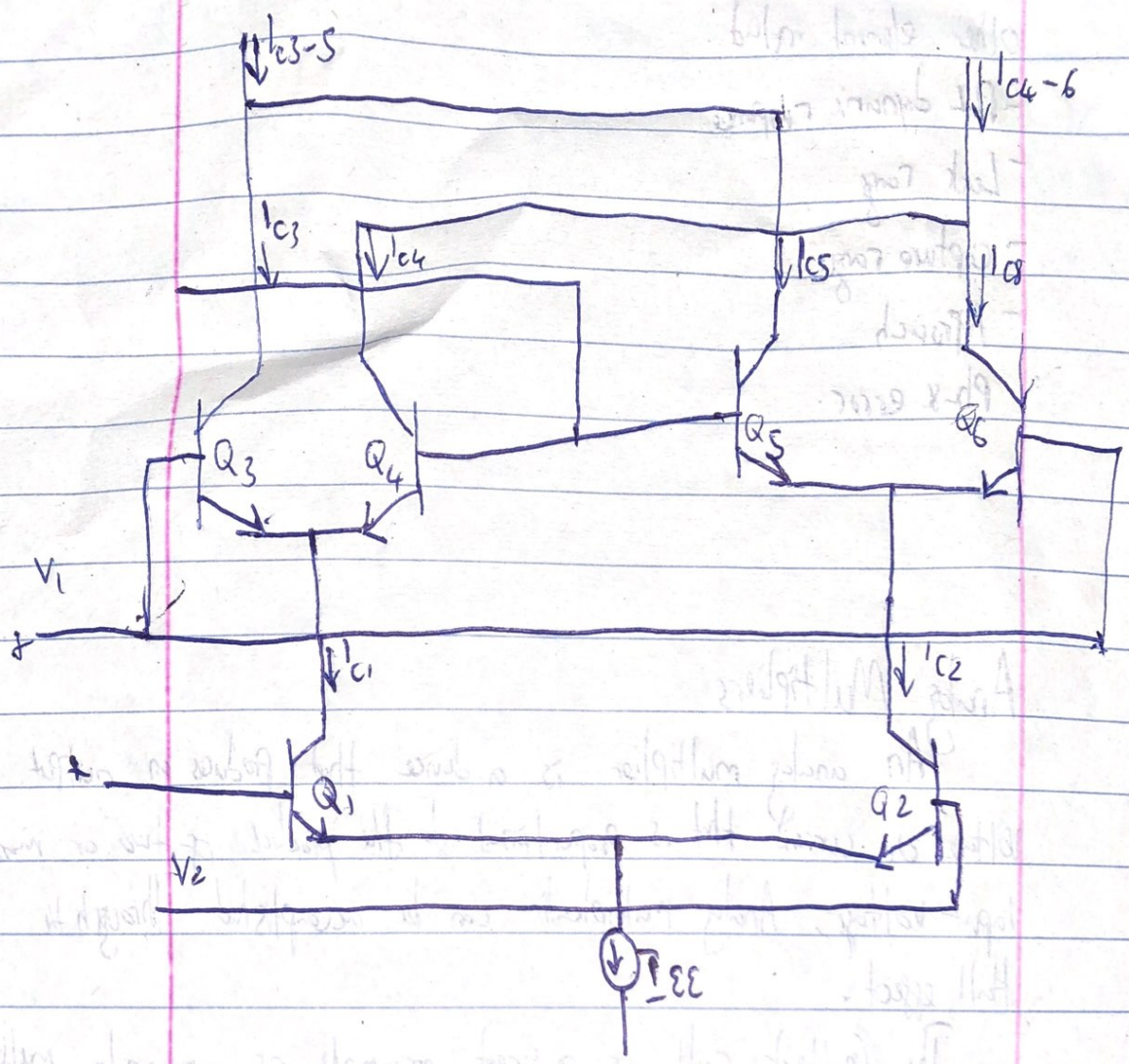
other element inlud.

- PLL dynamic response
- Lock rang
- capture rang
- Approach
  Phase error.

Analog Multipliers

An analog multiplier is a device that produces an output voltage or current that is proportional to the product of two or more input voltage. Analog multiplication can be accomplished through the Hall effect.

The Gilbert cell is a great example of an analog multiplier called it ~~Servos~~ as a mixer i-e it produces output signal that are proportional to the product of two input signals. Its output current is a quadrant multiplication of its two differential input.


I_{C3-5}
I_{C4-6}
I_{C3}
I_{C4}
I_{C5}
I_{C6}
Q_3
Q_4
Q_5
Q_6
V_1
I_{C1}
I_{C2}
Q_1
Q_2
V_2
$33I$

Application of Gilbert Cell

multip

① If $V_1 < V_T$ & $V_2 < V_T$ then it works as an then $\tan(V_1/V_2) = V_1/V_2$

② If both inputs are larg compare to V_T it acts as a phase detector