BEC
Assignment-3

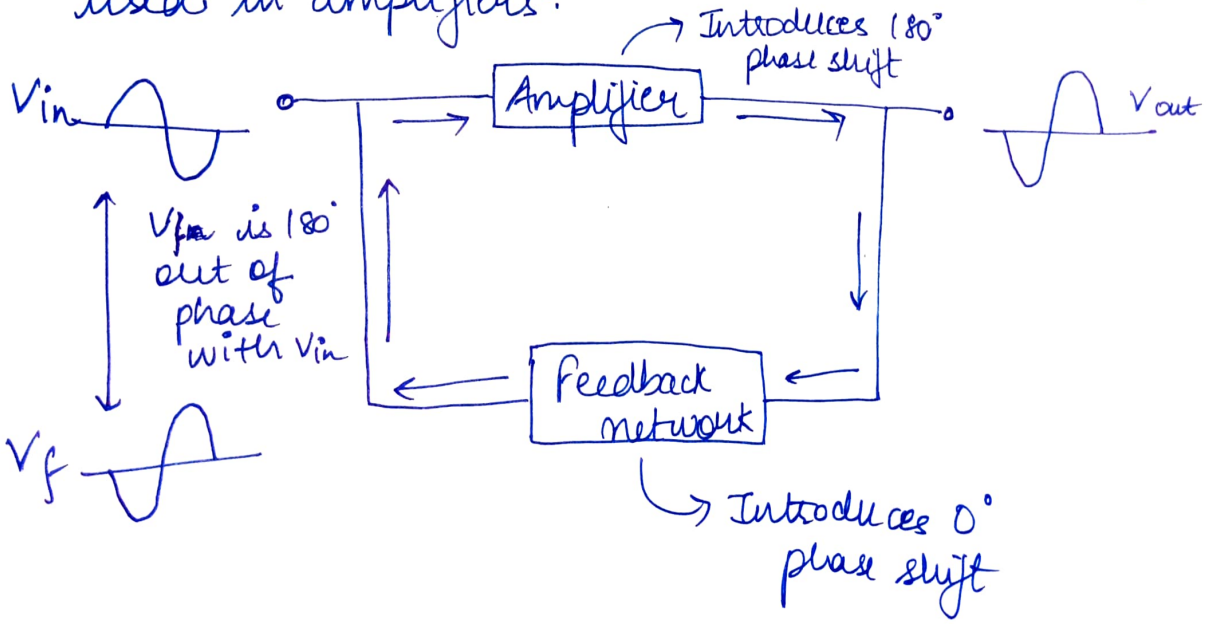
Mehak Gupta
D3-IT-B
1921064 / 1905363

1) Different types of feedback in oscillators.

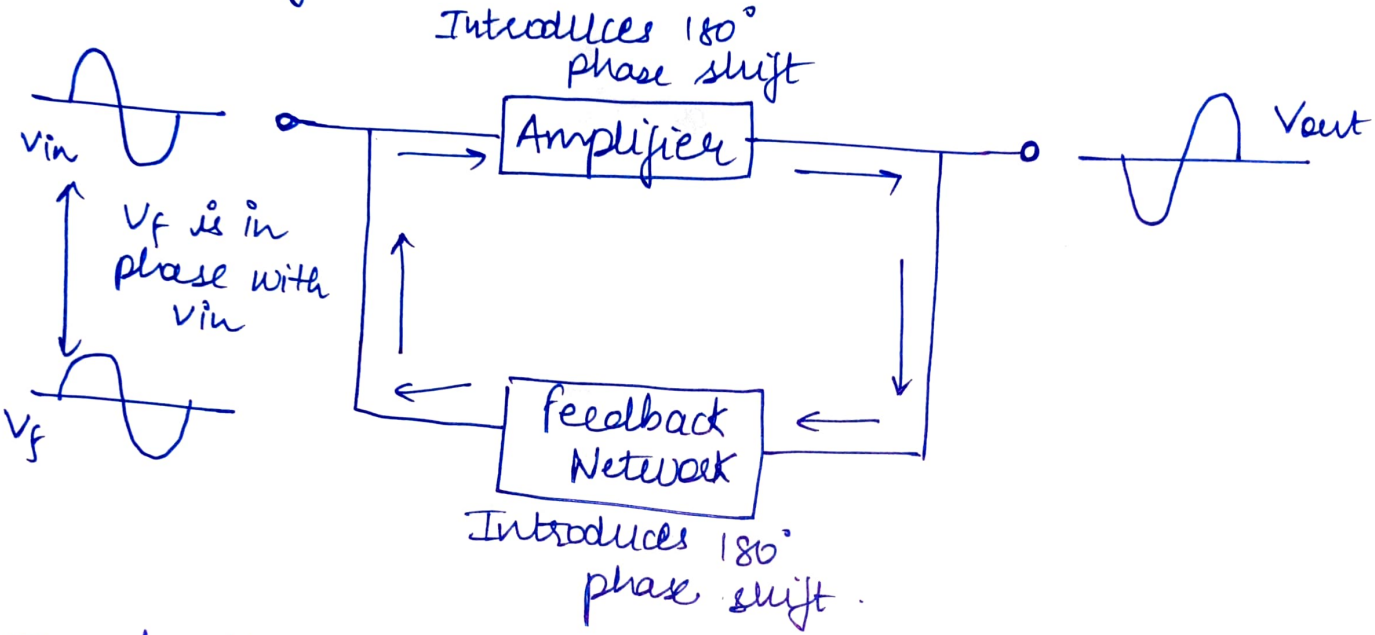
Ans- The phenomenon of feeding a portion of the output signal back to the input circuit is known as feedback. The effect results in a dependence between the output and input and an effective control can be obtained in the working of the circuit. Feedback is of two types -

- Negative feedback
- Positive feedback

(i) Negative feedback: In this, the feedback energy is out of phase with the input signal and thus opposes it. It reduces gain of the amplifier and also reduce distortion, noise and instability. This feedback increases bandwidth and improves input and output impedances. Due to these advantages, the negative feedback is frequently used in amplifiers.



(ii) Positive feedback : In this, the feedback energy is in phase with the input signal and thus aids it. Positive feedback increases gain of the amplifier also increases distortion, noise and instability. Because of these advantages, positive feedback is seldom employed in amplifiers. But the positive feedback is used in oscillators.



The feedback that is used in an oscillator is positive feedback. The oscillator which acts as an amplifier makes use of positive feedback to generate an output frequency. Hence the oscillator is self-driven as the signal is regenerative. Positive feedback is used mainly because it satisfies Barkhausen's criteria in order to form sustained oscillations.

(Q) Discuss QPSK modulator in detail.

Ans- Quadrature Phase shift keying (QPSK) is a form of phase shift keying in which two bits are modulated at once, selecting one of four possible carrier phase shift (0, 90°, 180° or 270°).

QPSK allows the signal to carry twice as much information as ordinary QPSK using the same bandwidth.

QPSK is used for satellite transmission of MPEG 2 Video, cable modems etc.

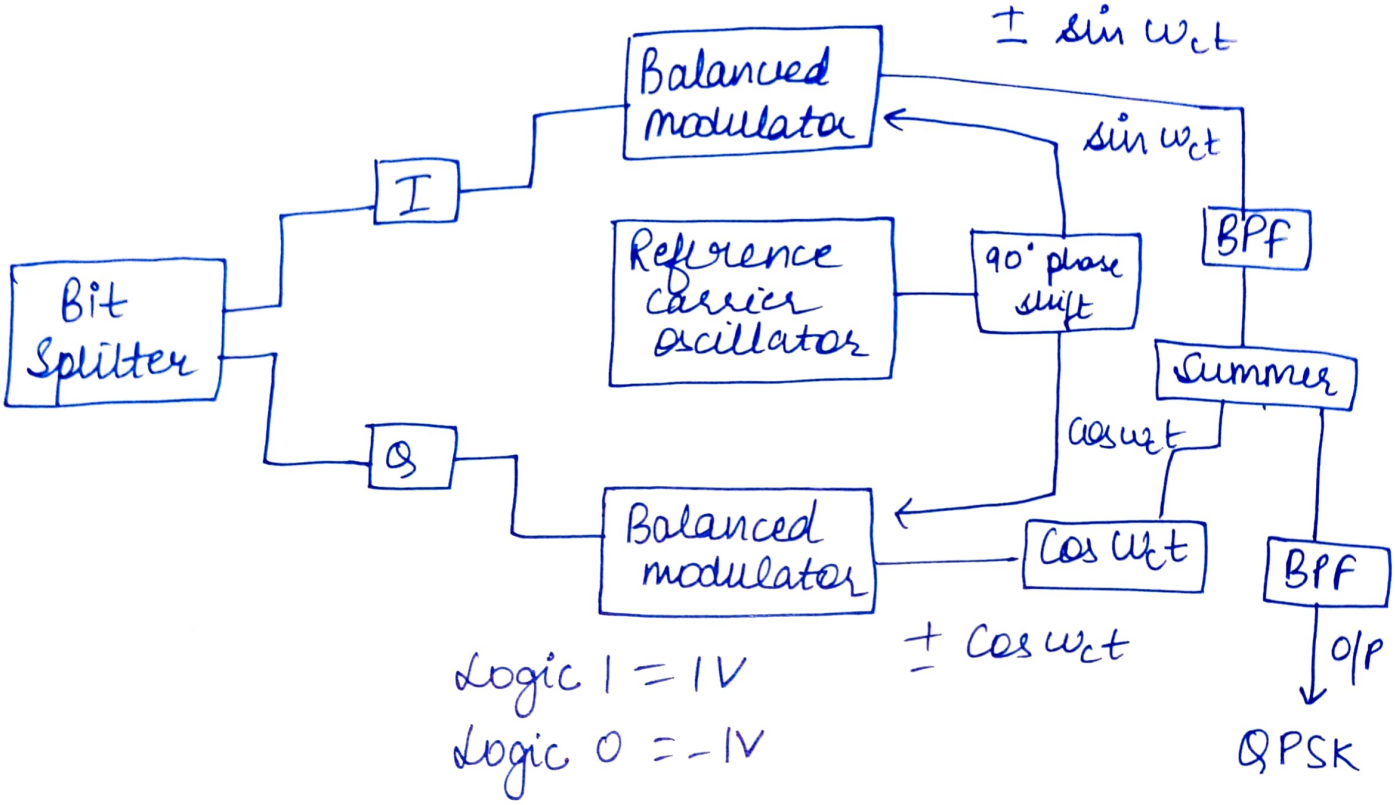
$\pm \sin \omega_c t$, $\pm \cos \omega_c t$

modulated on the basis of logic 0 and logic 1.

QPSK is a M-ary encoding technique where M = 4, With QPSK, 4 output phases are possible for a single carrier frequency. ∴ 4 different input containers will be used.

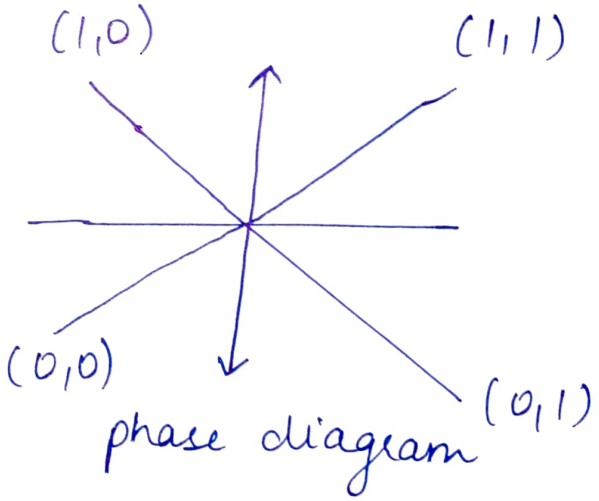
QPSK transmitter -

O/P ⟶ $\begin{bmatrix} +\sin \omega_c t & +\cos \omega_c t \\ +\sin \omega_c t & -\cos \omega_c t \\ -\sin \omega_c t & +\cos \omega_c t \\ -\sin \omega_c t & -\cos \omega_c t \end{bmatrix}$



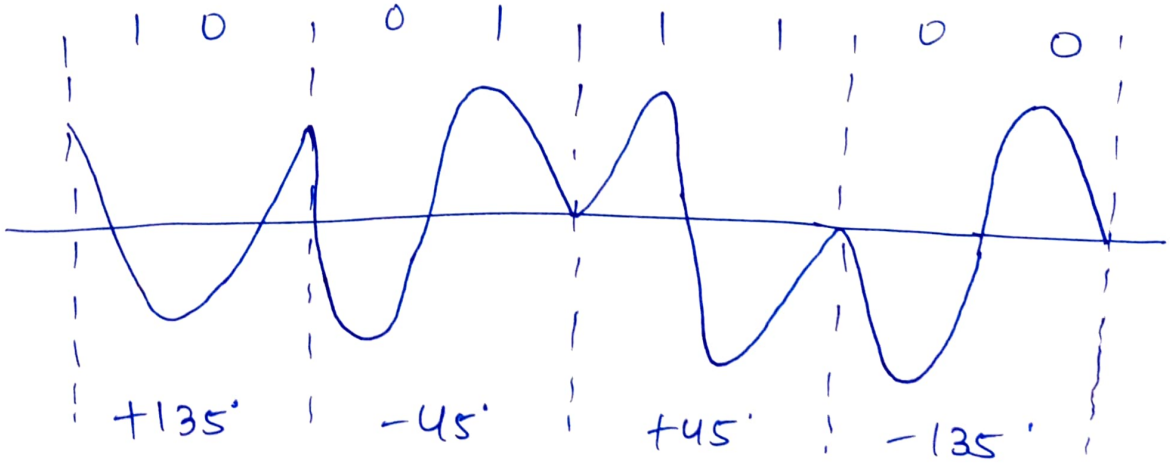
Truth table

a	I	O/P phase
0	0	-135°
0	1	-45°
1	0	+135°
1	1	+45°



→ Constellation diagram -

Output phase :



→ QPSK Reciever –

The power splitter for the reciever directs the ~~ipt~~ inputt QPSK signal to I and Q detectors and carrier recovery circuit. To reproduce the original transmit carrier oscillator signal. The QPSK signal is demodulated in I and Q products detector which generates the original IQ databits. The O/P of the detectors are fed to the bit combining circuit where they are converted from parallel I & Q data channels to a single binary Outputt datastream.