Pll - Introduction, Block Schematic

Although the evaluation of the phase-locked loops began in 1930s, its cost outweighed its advantages at first. With rapid development of ICs, however , the phase-locked loop has emerged as one of the fundamental building blocks in electronics technology. The phase-locked loop principle has been used in applications such as FM(frequency modulation) sterio decoders, motor speed controls, tracking filters, FM demodulators, FSK decoders and TV tuners.

Frequency synthesis is currently a very important PLL application area. The emphasis of this course will however be for the most part on basic PLL theory and telecommunication applications.

A discussion of various synthesizer types will also be include The LPLL (Best) or analog PLL is the classical form of PLL. All components in the LPLL operate in the continuous-time domain.

PLL block diagram :

phase-locked loop block diagram consists of

1. Phase detector
2. Low pass filter
3. Voltage control oscillator.

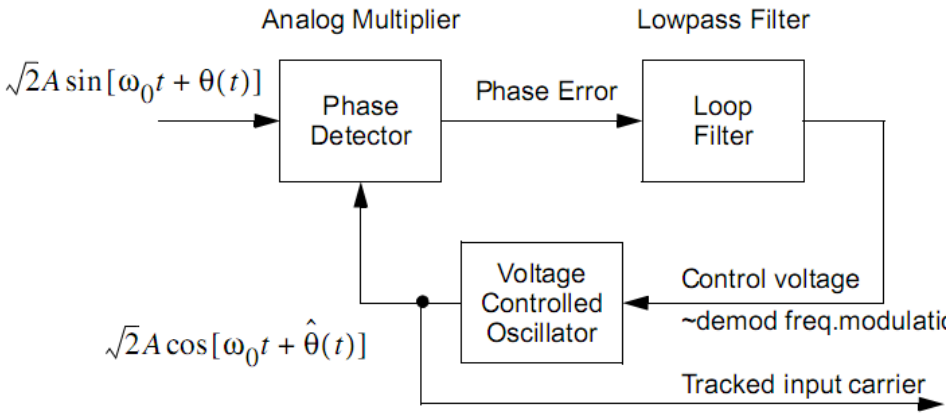

Figure 4.8

The phase detector is typically some form of analog multiplier, either a double-balanced mixed (DBM) or an active fourth quadrant multiplier at some point.

The phase error function is of the form

$$\phi(t) = \underbrace{K_m K_1 A}_{K_D} \sin\left[\theta(t) - \hat{\theta}(t)\right] \overset{\text{small error}}{\approx} K_D\left[\theta(t) - \hat{\theta}(t)\right]$$

The loop filter may be active or passive, but it typically results in the loop being either first-order or second-order

The design/analysis of the loop filter makes use of the Laplace transform.

Applications of PLL:

1. Frequency multiplier
2. Frequency shift keying demodulator
3. FM Demodulator.