SUBJECT: BASIC ELECTRONICS

Introduction to Filter

Elementrix Classes

Introduction to Filter

A filter is a circuit capable of passing certain frequencies while attenuating (to reduce or block) other frequencies. Thus, a filter can extract important frequencies from signals that also contain undesirable or irrelevant frequencies. In the field of electronics, there are many practical applications for filters.

Broadly filters can be classified as passive and active filters.

1. **Passive filters** consist of passive elements such as resistors, capacitors and inductors. They are most responsive to a frequency range from 100 Hz to 300 MHz. The limitation at lower frequency is the requirement of higher range of the inductance and capacitance.

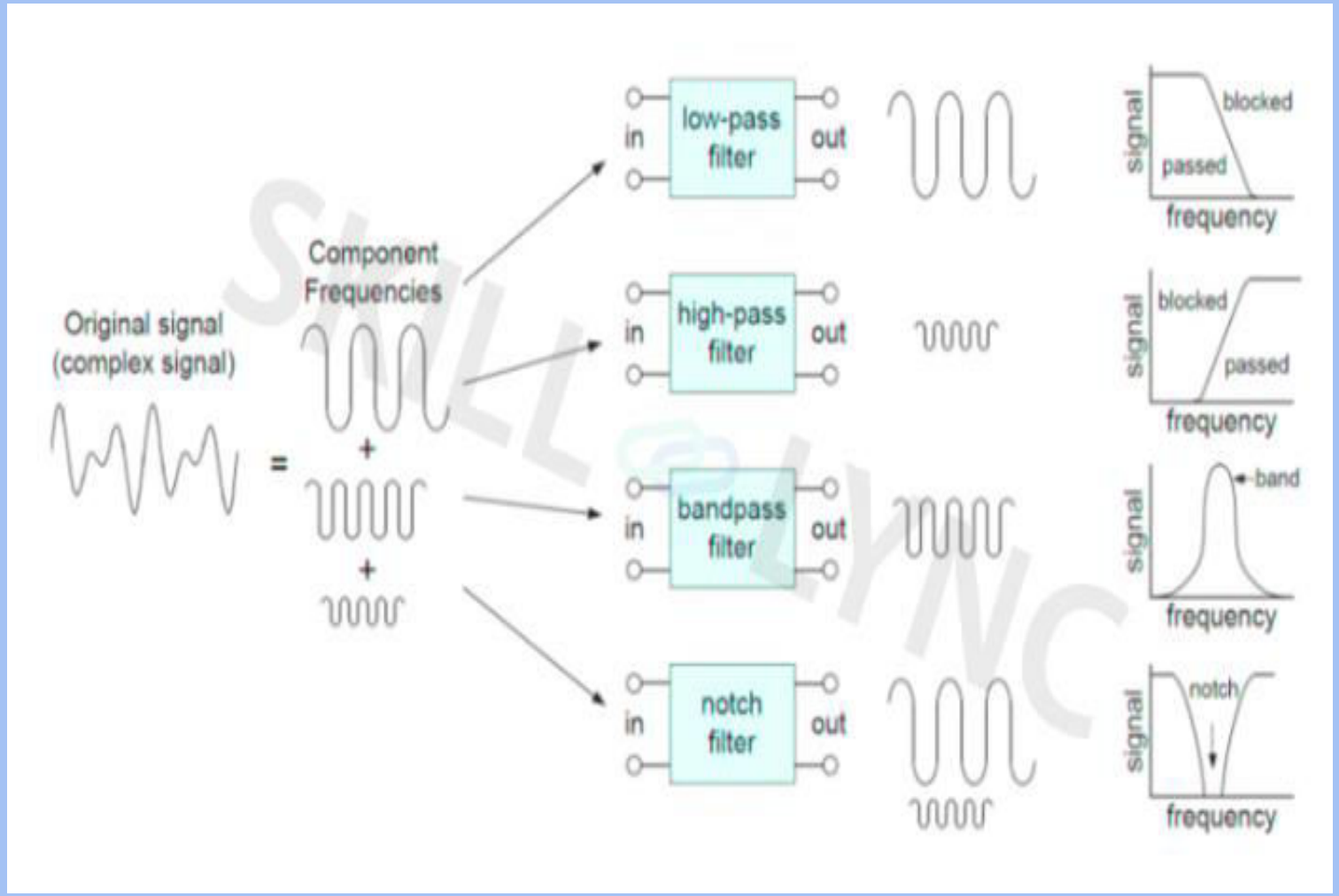
The upper-frequency limit is due to the effect of parasitic capacitances and inductances. They have no amplifying elements so they have no signal gain, therefore the output level is always less than the input. One of the most common examples of passive filters is a R-C circuit which is responsible to eliminate noise from incoming signals.

2. Active filters are capable of dealing with very low frequencies (approaching 0 Hz), and they can provide voltage gain (passive filters cannot). Active filters can be used to design high-order filters without the use of inductors; this is important because inductors are problematic in the context of integrated-circuit manufacturing techniques. However, amplifier bandwidth limitations makes active filters less suitable for very-high-frequency applications. Radio-frequency circuits must often utilize passive filters.

Four Major Types of Filters-

Filters can be placed into broad categories that correspond to the general characteristics of the filter's frequency response. If a filter passes low frequencies and blocks high frequencies, it is called a low-pass filter. It is a high-pass filter if it blocks low frequencies and passes high frequencies. There are also band-pass filters, which pass only a relatively narrow range of frequencies, and band-stop filters, which block only a relatively narrow range of frequencies. The four types of filters can be listed as-

1. **Low pass filters**
2. **High pass filters**
3. **Band pass filter**
4. **Band stop(band reject or notch) filter**


Original signal
(complex signal)
=
Component
Frequencies
+
+
in
low-pass
filter
out
in
high-pass
filter
out
in
bandpass
filter
out
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filter
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पढ़िए और पढ़ाइये

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