pulse repetition frequency in case of MTI radar.

Ans:

Staggered PRF

Oct./Nov.-17, Set-3, Q4(b)

The pulse repetition frequency in which the switching is pulse to pulse is known as staggered PRF. The concept and usage of staggered PRF is as follows,

Concept of Multiple or Staggered Pulse Repetition Frequencies (PRF's)

In the design of Doppler filters for MTI radars, using multiple pulse repetition frequency decreases the effect of blind speeds and further it sharpens the lower cut-off frequency in the frequency response. The blind speeds of two radars working at the same carrier frequency can be made different by choosing different pulse repetition frequencies. The operation of two independent radars can be obtained with one radar which time-shares its pulse repetition frequency between two or more different values. For every other scan, the pulse repetition frequency might be switched. A single radar can also have blind speeds in succession if the PRF is staggered, with the successive PRFs not being the same.

Figure (1) shows an example of the average response of an MTI radar operating with two separate pulse repetition frequencies on a time-shared basis.

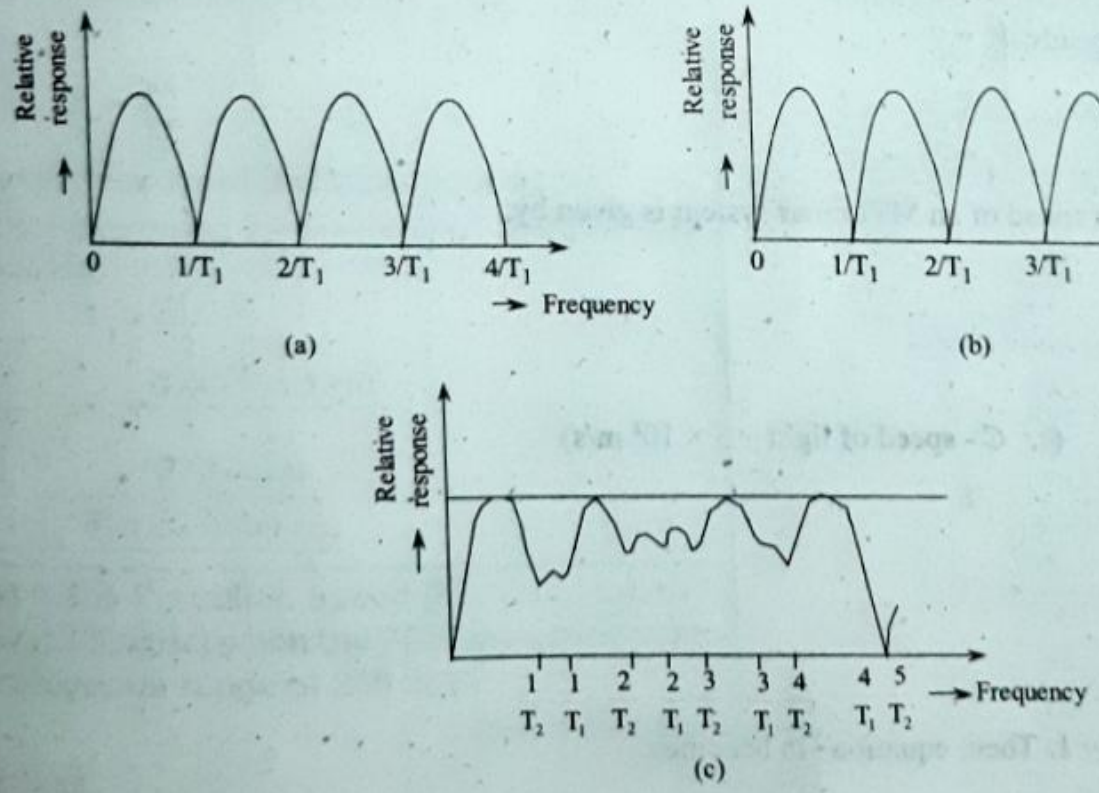

Figure (1)

Figure 1(a) shows the frequency response of a single delay-line Canceller for $f_P = \frac{1}{T_1}$. Figure 1(b) shows the frequency response of a single delay-line canceller for $f_P = \frac{1}{T_2}$. And figure 1(c) shows the composite response with $\frac{T_1}{T_2} = \frac{4}{5}$. Generally blind speeds occurs due to zero MTI response. In the above case, zero response occurs only when the blind speeds of each PRF coincide, which is the rare case.

Thus, the effect of blind speeds can be reduced by operating MTI radar at more than one PRF.