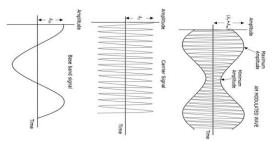


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Amplitude Modulation & prove of modulation index

A continuous-wave goes on continuously without any intervals and it is the baseband nessage signal, which contains the information. This wave has to be modulated According to the standard definition, "The amplitude of the carrier all varies in accordance with the instantaneous amplitude of the modulating signal." Which means, the amplitude of the carrier signal containing information, at each instant. This can be well explained by the following figures.



The first figure shows the modulating wave, which is the message signal. The next one is the carrier wave, which is a high frequency signal and contains no information. While, the last one is the resultant modulated wave.

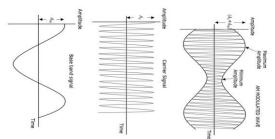
It can be observed that the positive and negative peaks of the carrier wave, are interconnected with an imaginary line on the carrier wave is called as Envelope, It is the same as that of the message signal.

Mathematical Expressions

Floolwing are the mathematical expressions for these waves. Time-domain Representation of the Waves Let the modulating signal be, mile-Amova(2-firm) and the carrier signal be, cite-Acova(2-fird) Where-Am and Ac are the amplitude of the modulating signal are because in an and is are the frequency of the modulating signal and the carrier signal respectively. Then, the equation of Amplitu Modulated wave will be syl-[Ac-4-mova(2-firm)]cvo(2-fird) (Equation 1)

Modulation (Mod. A. Carrier wave, after being modulated, if the modulated level is calculated, then such an attempt is called as Modula Index or Modulating-Carrier) were first the such an object of the carrier signal carrier wave undergoes. Rearrange the Equation 1 as below.

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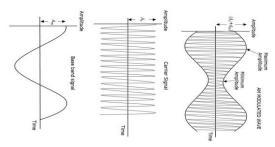
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Mathematical Expressions Following are the mathematical expressions for these waves. Time-domain Representation of the Waves Let the modulating signal be, m(t)=Amcos(2πfmt) and the carrier signal be, c(t)=Accos(2πfct) Where,Am and Ac are the amplitude of the modulating signal and the carrier signal respectively in an of care the frequency of the modulating)loc(2πfct) (Equation 1)

Modulation Index A carrier wave, after being modulated, if the modulated level is calculated, then such an attempt is called as Modulation Index or Modulation Depth. It states the level of modulation that a carrier wave undergoes. Rearrange the Equation 1 as below.

Rearrange the Equation 1 as below. $s(t) = Ac[1 + (Am/Ac)cos(2\pi fint)]cos(2\pi fct) \Rightarrow s(t) = Ac[1 + \mu cos(2\pi fint)]cos(2\pi fct) \text{ (Equation 2)}$

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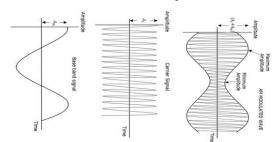
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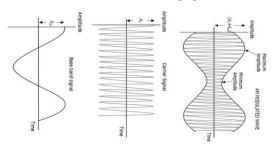
 $s(t) = [Ac + Am\cos(2\pi fint)]\cos(2\pi fct) \text{ (Equation 1)} \\ \textbf{Modulation Index} \quad A \text{ carrier wave, after being modulated, if the modulated level is calculated, then} \\$ such an attempt is called as Modulation Index or Modulation Depth. It states the level of modulation and attempts called as modulation lines of modulation $\mathbb{E}[x]$ it states the reverbility that a carrier wave undergoes. Rearrange the Equation 1 as below. $s(t)=Ac[1+(Am/Ac)cos(2\pi fint)]cos(2\pi fict) \Rightarrow s(t)=Ac[1+\mu cos(2\pi fint)]cos(2\pi fict)$ (Equation 2) 6

A continuous-wave goes on Amplitude Modulation & prove of modulation index continuously without any intervals and it is the baseband message signal, which contains the information. This wave has to be modulated. According to the standard definition, "The amplitude of the carrier signal varies in accordance with the instantaneous amplitude of the modulating signal." Which means, the amplitude of the carrier signal containing no information varies as per the amplitude of the signal containing information, at each instant. This can be well explained by the following figures.



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