PAM in Satellite Radio

The Pulse Amplitude Modulation is the simplest form of pulse modulation. In this technique transmits data by varying the voltage or power amplitudes of individual pulses in a timed sequence of electromagnetic pulses. Or in other words, the data to be transmitted is encoded in the amplitude of a series of signal pulses, PAM can also be used for generating additional pulse modulations. And if you look at this from a purely theoretical standpoint, the possible pulse amplitudes in pulse amplitude modulation can be infinite. It is the case with analog pulse amplitude modulation. The A 2 level pulse amplitude modulation causes the resulting signal to be digitized while a 4 level pulse amplitude modulation has 22 possible discrete pulse amplitudes. The 8-level pulse amplitude modulation has 23, and 16-level pulse amplitude modulation has 24 discrete pulse amplitudes.

Concerning various pulse amplitude modulations, some systems maintain the amplitude of each pulse directly proportional to the instantaneous modulating-signal amplitude at the time of pulse occurrence. Simply pulse amplitude modulation systems, the reverse is true - that is, inversely proportional to the instantaneous modulating-signal amplitude at the time of pulse occurrence and in other pulse amplitude modulation systems, the amplitude is dependent on additional factors related to the modulating signal such as the instantaneous frequency and phase, which may be different than its strength. Though, in practical telecommunication applications, pulse amplitude modulation is a rare use technology, having been superseded by other techniques such as pulse position modulation and pulse code modulation.

Moreover, a technology called quadrate amplitude modulation is widely used in telephone modems with a data transfer rate of more than 300 Kbps. As newer technologies are fast making their presence known, it should be noted that pulse amplitude modulation is still useful in the popular Ethernet communication standard. For instance, 100BASE-T2 - operating at 100Mb/s - Ethernet medium is using 5 level PAM modulations running at 25 mega pulses/sec over four wires.

Afterward developments include the 100BASE-T medium which raised the bar to 4 wire pairs, running each at 125 mega pulses/sec in order to achieve 1000 Mbps data transfer rates, but still with the same PAM5 for each pair. And currently, PAM12 and PAM8 have gained consideration in the newly proposed IEEE 802. The applications of Quadrate Amplitude Modulation 64-QAM and 256-QAM are often used in cable modem and digital cable television applications. In actual fact, 64-QAM and 256-QAM are the mandated modulation directives for digital cable television, as laid down by SCTE in the standard ANSI/SCTE 07 2000.The Phase modulation and phase shift keying can be regarded as special cases of quadrate amplitude modulation where the amplitude of the modulating signal is constant and the phase only changing and the same theory can further be extended to frequency shift keying and frequency modulation.

About the Author

Tymon Hytem has worked in the electronics field for the past 15 years. He enjoys helping people decide on electronic gadgets from telephones to XM Radio and choosing the perfect XM Satellite Radio system for their needs.

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