Pulse Code Modulation In Satellite Radio

Pulse amplitude modulation, pulse width modulation and pulse position modulation form cases of analog pulse system. Pulse code modulation and delta modulation form cases of digital pulse modulation. Pulse code modulation in similarity with other pulse modulations uses the sampling technique but it differs from the others in that it is a digital process. Thus Pulse code modulation generator produces a series of numbers or digits, each of which represents the approximate magnitude of the signal sample at that instant. This approximation may be made as close as desired but at best it remains an approximation. In Pulse code modulation the total amplitude range of the signal is divided into a number of standard levels at equal intervals. These levels are transmitted in a binary code. Hence the actual number of these standard levels is a power of two such as sixteen, thirty two or one twenty eight.

Practically systems use as many as one twenty eight levels. By the so called quantizing process, the level actually sent at any sampling instant is the one nearest to the standard level. Thus if the signals is 10.2 volts at any time, it is sent as the digit ten since ten volts is the standard amplitude nearest to 10.2 volts. This digit ten is sent at that time instant as a series of pulses corresponding to number ten. The signal is continuously sampled and quantized, each sample magnitude being converted to the nearest standard amplitude. The quantized number is coded using binary code converted into corresponding back to front binary numbers and then sent. If adequate quantizing levels are used the result closely resembles the corresponding analog transmission. Generally a supervising bit is added to each binary code group representing a quantized sample each group of pulses denoting a sample referred to a word is thus expressed by n+ 1 bit. The quantized signal some what differs from the actual signal. This amounts to introduction of same distortion called quantizing noise. The word noise is used here since the error so introduced is random in nature. This random nature results because the difference between the quantized levels or digit and actual signal at that instant of time is completely unpredictable or random. It is obvious that the maximum quantization error equals half the sampling unit. But it is wrong to assume that signal to quantizing noise ratio of this system is thirty two is to one because neither the signal nor the instantaneous quantizing error has always its maximum value. The above consideration and several others influence the quantizing noise. Thus quantizing noise for a given number of quantizing levels can be calculated only using statistical methods.

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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