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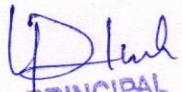
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Modulation and Demodulation of Image Processing by Using GMSK

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Abstract

Today digital communication is widely used in telecommunication sector in which the information is coded in the form of bits. There are many techniques that are implemented for modulation in digital communication some of them are BPSK, QPSK, M-ary PSK, GMSK. While transmitting an image there is always a challenge to retain the quality of an image by using these digital modulation techniques. In this paper GMSK technique is used for transmitting an image. The GMSK modulation technique is widely used in GSM techniques. By using GMSK modulation technique, which carries the information with high data rate and this is very important for image transmission. The proposed system gives better results than other modulation techniques like BPSK and M-ary PSK.

Keywords: GMSK, image processing, PSNR, MSE, Std.Dev.

1. Introduction

In this paper GMSK technique is used for transmitting an image. In GSM the GMSK modulation technique is used. GMSK modulation technique, which carries the information with high data rate and this is very important for image transmission. There are many modulation techniques in communication system and an image can be transmitted.
To achieve better values of Bit Error Rate, Signal to noise ratio & Bandwidth.
As an image can be easily converted into the digital data, it is possible to transmit an image using the this technique. Out of which the GMSK is the suitable technique for sending images in GSM technology [1].

2. Gaussian Minimum Shift Keying (Gmsk)

2.1. Generating GMSK Modulation

Gaussian Minimum Shift keying is the technique which used for GSM modulation. It is generated as shown in Fig 1. GMSK modulator uses LPF ,VCO & RF amplifier.
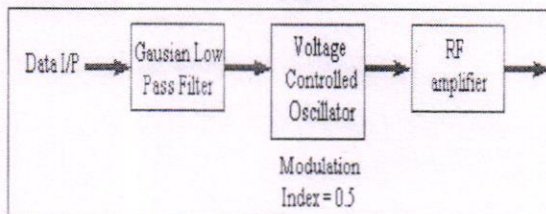

Figure 1: GMSK generator with gaussian filter and VCO

Another method to generate GMSK is as shown in Fig 2. For generating GMSK In phase & Quadrature Phase Components are separated and multiplies with Cos & Sin carrier respectively or vice-versa.
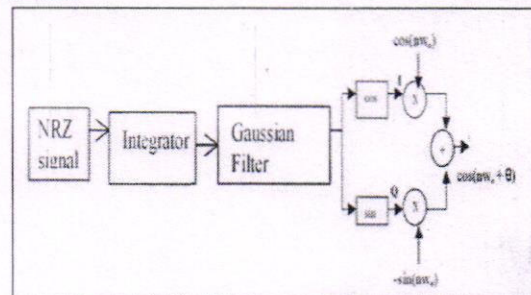

Figure 2: GMSK Generator using I-Q components

2.2. GMSK Bit Error Rate

Error probability can be calculated using following formula.

$$Pe = (\sqrt{\frac{2\alpha Eb}{No}}) \tag{1}$$

Where
α= BT constant, α= 0.68 for GMSK and BT= 0.3.
A filter ideally has an output before input, it can be estimated using only a delayed and shaped impulse response which has a shape like Gaussian. This is known as GMSK modulation.
One of the binary digital modulations is GMSK, its BER performance over something in the high SNR. These schemes are depends on more than 2 levels (e.g. QAM, QPSK) which require better SNR than two-level schemes for similar BER performance. [4, 6, 7].