A DIGITAL SYSTEM FOR NAVIGATION AN AUTONOMOUS MOBILE VEHICLE

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1. Introduction

Most used by the navigation system signals are bursts and chirps. Each of this methods has unfortunately, a lot of disadvantages, by teamwork. There is an additional necessity about stabile, undisturbed odometer-signal system, by acting a multiple autonomous mobile vehicles at the same time. In this paper, a novel method of signal coding is presented, which fulfil the requirements above. The basic idea is a combination of two frequencies, which are split by " a while of silence", decided for the accuracy of this method. This signal coding is designed to be in a digital measure system applied.

2. The new coding method

A sonar system works on the Echo-lots principle and it is very important to recognize the self-echo impulse. The problems appear, when is necessary, to use more than one mobile vehicle in the same time, in the same indoor area. In demand stay conditions: possible more different signals, high accuracy and fast signal processing.

Among the known telecommunication coding methods are Amplitude Modulation (AM), Frequency Modulation (FM), Frequency Shift Keying (FSK).

The coded signal, presented in this paper consists of two frequency-shifts, whereat both frequencies are bordering on a *Non Signal Stage (NSS)*, like it is shown at figure 1 a. The duration of the *NSS* is comparable to the periods of the used signals. Each monotone-frequency element of the pattern consists of a certain number of periods depending on its position in the pattern, its frequency value and the characteristics of the used sensors.

The secure codes is the burst combinations between the carrier frequencies, which insure very good ability to recognizing the sonar system.

The accuracy here depends on the environment's conditions (air-temperature and humidity) and the tolerance. Thanks of the reduced number of bursts, a higher work rapidity is achieved and a digital processing is simplified, compared to the previous experiments[1].

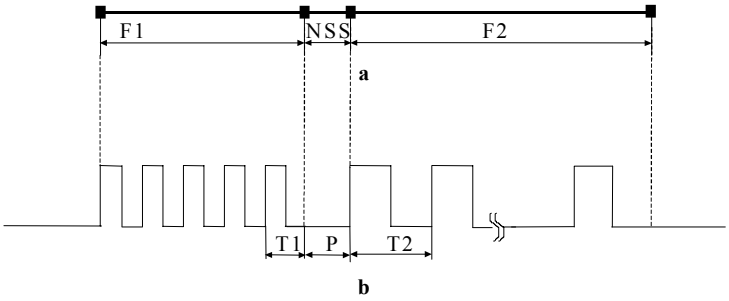

Figure 1. a) Frequencies combination; b) Recognation

3. Implementation in a digital system

This coding is faced to a digital computing system. Such an implementation insures a simple hardware equipment and a brief processing time, with a great accuracy (sub millimetre area).

The key idea here is to describe a coding method for a digital navigation system, what allows work for more sonar systems at the same time with a great accuracy and at real time.

The described above method allows a generation of great number of combinations, which permits many mobile vehicles to be exploited in the same time in the same indoor area. That is a prerequisite for weighty automation in many industry branches.

A possibility for further researches is the development a multi-echo system with a greater degree of intelligence.

References

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