The system applying millimeter-wave radar is now widely used for monitoring rear direction and the periphery as well as front direction. In June 2006, we developed the radar for PCS (Pre-crash safety system), which aims at protecting passengers from neck injuries, the most frequent type of injury in traffic accidents. This radar, our first product with monopulse system, has characteristics of compact, wide-angle detection, and high-speed processing. This paper describes three-channel monopulse principle that we applied, and our challenges.
Development of 76GHz Millimeter-Wave Radar for Rear Short Range

Introduction

(1) detect by radar any vehicles approaching with danger of crashing from behind,
(2) warn with flashing hazard lights,
(3) reduce the risk of neck injuries by moving the headrests to an optimum position, in an unavoidable accident.

Rear PCS System and Requirements on Radar

(1) detect by radar any vehicles approaching with danger of crashing from behind,
(2) warn with flashing hazard lights,
(3) reduce the risk of neck injuries by moving the headrests to an optimum position, in an unavoidable accident.

Main Specifications for Radar

(1) Wide-area detectability for detecting any vehicles approaching from behind.
(2) High-speed response for moving headrest with appropriate timing.
(3) Compactness to enable installation in the restricted area such as in a bumper.
Radar System

A radar system is a device that uses electromagnetic waves to detect and locate objects or reflectors. It consists of a transmitter that sends out a pulse of energy and a receiver that can detect the returning signal. The time delay between transmission and reception is used to determine the distance to the object. In this context, the paper discusses the design and implementation of a radar system, including the details of the antenna structure and the phase difference equation.
Development of 76GHz Millimeter-Wave Radar for Rear Short Range

Radar Structure

Signal Processing Part

Existing design

Design partially changed

New design

Power supply
Detected Results by Radar

Profiles of Writers

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