Abstract: Determination of Optimum Bistatic Angle for Radar Target Classification

Sung-Jun Lee[1], In-Sik Choi[1*], Joon-Ho Lee[2] and Edward J. Rothwell[3]
[1]*Department of Electronic Engineering, Hannam University,*
133 Ojeong-dong, Daedeok-gu, Daejeon 306-791, Korea
[2]*Department of Information and Communication Engineering, Sejong University,*
98 Gunja-Dong, Gwangjin-Gu, Seoul 143-747, Korea
[3]*Department of Electrical and Computer Engineering,*
Michigan State University East Lansing, MI 48824-1226, USA
radar@hnu.kr, recog@hnu.kr, joonhlee@sejong.ac.kr, rothwell@egr.msu.edu
[*]*Corresponding author: In-Sik Choi (recog@hnu.kr)*

Abstract

The transmitter and receiver positions are of great importance in bistatic radar. The radar cross section (RCS) of a target varies with these positions, and the target classification performance is considerably influenced by RCS. In this study, the target classification performance using the bistatic RCS of four different wire targets was analyzed. Time-frequency analysis methods were used for feature vector extraction from the bistatic RCS of each target, and a multilayered perceptron (MLP) neural network was used as a classifier. The optimum receiver position was found by comparing the calculated classification probabilities while changing the position of the bistatic radar receiver. To compare the performance of monostatic and bistatic RCS, we also calculated the classification probability using monostatic radar. The simulation results show that an optimally positioned bistatic radar yields better results than does a monostatic radar, demonstrating the importance of the positions of the transmitter and receiver for bistatic radar.

Acknowledgement

This work was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science & Technology (No. 2011-0003209).