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# 共形阵列天线单元极化形式的优化设计

齐子森, 郭英, 王布宏, 侯文林

空军工程大学 电讯工程学院, 陕西 西安 710077

## Optimal Design for Conformal Array Antennas with Respect to Element Polarization

QI Zisen, GUO Ying, WANG Buhong, HOU Wenlin

Telecommunication Engineering Institute, Air Force Engineering University, Xi'an 710077, China

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**摘要** 由于共形载体曲率的影响,共形阵列天线的阵列流形具有多极化特性。为了利用共形天线阵列流形的多极化特性,提升阵列对空间目标参数的估计性能,将天线单元的极化参数引入到导向矢量建模中,更加完整地论述了共形天线阵列流形的特点。在此基础上,建立了优化设计天线单元极化形式的目标函数,基于交替优化思想,给出了共形阵列中各天线单元最优极化形式的设计方法。以锥面共形阵列天线为例的计算机仿真实验表明,在给定阵列几何结构的前提下,通过优化天线单元的极化形式,可以有效提高阵列对空间信源方位参数估计的理论性能。

**关键词：** 共形阵列天线   导向矢量   极化   参数估计   理论性能

Abstract：Due to the effect of the conformal carrier curvature, polarization diversity of the element patterns is a distinct feature of the conformal array antenna manifold. In order to improve the spatial parameter estimation performance by using the polarization diversity of the element patterns, this study formulated a rigorous model of the conformal array manifold with detailed consideration of polarization diversity of the element patterns which introduces the polarization parameters of the elements into the steering vector, and describes more completely the characteristics of the conformal array manifold. On this basis, the objective function for the optimal polarization design for the conformal array antennas is derived and the optimal design method for conformal array antenna with respect to element polarization is obtained by the alternating optimization theory. The simulation results with a conical conformal array antenna demonstrate that with given array geometry the theoretical performance of the direction parameter estimation can be improved effectively through optimizing element polarization.

Keywords：conformal array antenna   steering vector   polarization   parameter estimation   theoretical performance

Corresponding Authors: Tel.: 029-84791763 E-mail: Guoying_dsp@sina.com    Email: Guoying_dsp@sina.com

About author: 齐子森(1982— )男,博士研究生。主要研究方向:阵列信号处理。 Tel: 029-84791763 E-mail: qizisen@163.com郭英(1961— )女,博士,教授,博士生导师。主要研究方向:通信信号处理、自适应信号处理等。 Tel: 029-84791763 E-mail: Guoying_dsp@sina.com 王布宏(1975— )男,博士,副教授。主要研究方向:阵列信号处理、阵列校正等。 E-mail: wbhcx@yahoo.com.cn 侯文林(1986— )男,硕士研究生。主要研究方向:阵列校正技术。 E-mail: wntyygyss@163.com

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