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Subband adaptive generalized sidelobe canceller for broadband beamforming

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Wei Liu ; S. Weiss ; L. Hanzo | All Authors

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Abstract

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Abstract:

We propose a novel subband adaptive broadband beamforming architecture based on the generalised sidelobe canceller (GSC), in which we decompose each of the tapped delay-line signals feeding the adaptive part of the GSC and the reference signal into subbands and perform adaptive minimisation of the mean squared error in each subband independently. Besides its lower computational complexity, this new subband adaptive GSC outperforms its fullband counterpart in terms of convergence speed because of its prewhitening effect. Simulations based on different kinds of blocking matrices with different orders of derivative constraints are presented to support these findings.

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1. INTRODUCTION

Adaptive beamforming has found many applications in various areas ranging from sonar and radar to wireless communications. It is based on a technique where, by adjusting the matched filters, a prescribed spatial and spectral selectivity is achieved. Fig. 1 shows a beamformer with a signal of interest from the direction of arrival (DOA) angle θ . Fig. 1: A signal impinging from an angle onto a beamformer with sensors.

Authors

Wei Liu

Communications Research Group, Department of Electronics & Computer Science, University of Southampton, UK

S. Weiss

Communications Research Group, Department of Electronics & Computer Science, University of Southampton, UK

L. Hanzo

Communications Research Group, Department of Electronics & Computer Science, University of Southampton, UK

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