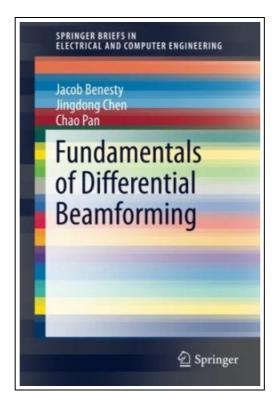
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Springer. Paperback. Condition: New. This book provides a systematic study of the fundamental theory and methods of beamforming with DMAs, or differential beamforming in short. From a physical perspective, a DMA of some order is defined as an array that measures the differential acoustic pressure field of that order; such an array has a beampattern in the form of a polynomial whose degree is equal to the DMA order. Therefore, the fundamental and core problem of differential beamforming boils down to the design of beampatterns with orthogonal polynomials. But constraints have to be considered so that the resulting beamformer does not seriously amplify the sensors self noise and the mismatches among sensors. In this work, we first present a brief overview of differential beamforming and some popularly used DMA beampatterns such as the dipole, cardioid, hypercardioid, and supercardioid. Then, some background knowledge on orthogonal functions and orthogonal polynomials is provided, which forms the basis of differential beamforming. Several performance criteria are subsequently revisited, which can be used to evaluate the performance of the derived differential beamformers. Next, differential beamforming is cast into a framework of optimization and linear system solving and it is shown how different beampatterns can be designed with this optimization framework. After that, several approaches are presented to the design of differential beamformers with the maximum DMA order, with the control of the white noise gain, and with the control of both the frequency invariance of the beampattern and the white noise gain. Finally, a joint optimization method is explained, which can be used to derive differential beamformers that have almost frequency-invariant beampatterns and meanwhile are robust to sensors self noise. This item ships from multiple locations. Your book may arrive from Roseburg, OR, La Vergne, TN. Paperback.

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