

Contents

1	Introduction	1
	References	3
2	Microphone Array Principles	5
2.1	Models of the Acoustic Signals and Sources	6
2.1.1	Microphone Array	6
2.1.2	Near Field Considerations	8
2.1.3	Microphones Array Configurations	8
2.1.4	Array Geometries	9
2.2	Sensor Arrays	12
2.3	Speech Processing Requirements	13
2.4	Microphone Array Beamforming	15
2.5	Far-Field and Near-Field Source Location	17
2.6	Speech Source Direction of Arrival Estimation and Localization	17
2.6.1	Sound/Speech Source Localization	18
2.6.2	Directional of Arrival Estimation	19
	References	20
3	Sources Localization and DOAE Techniques of Moving Multiple Sources	23
3.1	Direction of Arrival Estimation Techniques	24
3.1.1	Conventional Beamformer for DOAE	24
3.1.2	Subspace DOA Estimation Methods	26
3.1.3	Maximum Likelihood Techniques	26
3.1.4	Local Polynomial Approximation Beamformer	27
3.2	Optimization Algorithms in DOAE	30
3.3	Time of Arrival Estimation Techniques	31
	References	32

4	Applied Examples and Applications of Localization and Tracking Problem of Multiple Speech Sources	35
4.1	Simulation of LPA Beamformer	35
4.1.1	Case 1 (One Source Case)	36
4.1.2	Case 2 (Well Separated Multi Sources Case)	39
4.2	Simulation of Frost Beamformers of Microphone Array	40
4.2.1	Case 1 (ULA of Ten Omnidirectional Microphones)	41
4.2.2	Case 2 (ULA of 5 Omnidirectional Microphones)	43
4.2.3	Case 2 (UCA of 5 Omnidirectional Microphones)	43
4.3	Linear Microphone Array for Live Direction of Arrival Estimation	47
	References	48
5	Challenges and Future Perspectives in Speech-Sources Direction of Arrival Estimation and Localization	49
	References	50
6	Conclusion	53

Direction of Arrival Estimation and Localization of
Multi-Speech Sources

Dey, N.; Ashour, A.S.

2018, XIV, 53 p. 22 illus., 19 illus. in color., Softcover

ISBN: 978-3-319-73058-5