Speech Dereverberation
Patrick A. Naylor and Nikolay D. Gaubitch
Springer, New York, NY, (2010) 388 pp. 179 USD, ISBN 978-1-84996-055-7

The authors' goal was to present a comprehensive overview of the current state of the art in advanced signal processing techniques for improving speech enhancement through speech dereverberation, a critically important field in meeting the high expectations of users of communications technologies in today's diverse and variable acoustical environments. The resulting compilation of papers, prefaced by an excellent, readable introduction and review of fundamental concepts, solidly fulfils that goal. The potential application of statistical dereverberation signal processing techniques to other fields of engineering is enabled through discussion of overarching issues such as distortion, noise, and robustness, and by the clarity and thoroughness of the papers themselves.

Methods covered include TRINICON with SIMO and MIMO solutions, linear predictive coding (LPC), blind dereverberation, inverse filtering and channel inversion methods, filtering without the use of room acoustics information, Eigen-decomposition, acoustic impulse response (AIR), simulation and recursive methods, and the problem of moving talkers. Single and multiple microphone cases are addressed throughout, as are issues such as online versus offline implementation, and speech production and voice characteristics, including unvoiced and silent speech segments, and critical microphone distance. Real world limitations of mathematically viable constructs and proposed practical remedies are discussed.

This book is targeted to established researchers and students at the masters and doctoral level and will be particularly attractive to those interested in detailed mathematical and statistical presentations of signal processing techniques. Each chapter begins with an abstract, and presents methods and techniques, detailed mathematical formulation of models used, experimental results in the form of graphs and tables, helpful summary and conclusions sections, and a wealth of references.

Working, practical solutions are proposed and presented, and paths forward outlined. Road maps to solutions in the form of derivations and algorithms make the book a thorough resource with the potential for valuable hands on training in state of the art solutions if used in conjunction with industry standard computational mathematics software packages. This book is highly recommended for anyone interested in learning about the latest state of the art solutions and future areas of research in this exciting and important field.

Emily Cross
Cx Associates
110 Main Street, Studio 1B
Burlington, VT 05401
emily@cx-assoc.com