SIGNAL ESTIMATION USING STOCHASTIC VELOCITY MODELS AND IRREGULAR ARRAYS

P. J. THOMSON

Institute of Statistics and Operations Research, Victoria University of Wellington, P.O. Box 600, Wellington, New Zealand

(Received January 17, 1989; revised January 7, 1991)

Abstract. Consider the situation where a plane wave signal is received by a spatial arrangement of recorders. Information derived from observations on such a process can be used to determine the speed and direction of the signal together with properties of the medium through which the signal is being propagated. Certain models for the case where the signal velocity can be regarded as stochastic and where the array is irregular are investigated and estimation procedures proposed. A major practical property of these models is that, unlike their deterministic counterparts, coherence decays to zero as distance between recorders increases.

Key words and phrases: Fourier analysis, array estimation, velocity estimation, space-time spectral analysis, random media, random arrays, frequency wavenumber processing.