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1.5.4.4. Transfer function of a 2-D system; 1.5.4.5. 2-D inverse ZT; 1.5.4.6. Application to the study of stability of LTI systems; 1.5.4.7. Minimum or non-minimum phase LTI system; 1.5.5. Frequency characterization of a random 2-D signal.; 1.5.6. Output of a 2-D system with random input; 1.6. 2-D Wold decomposition; 1.6.1. Innovation, determinism and regularity in the 2-D case; 1.6.2. Total decomposition of three fields; 1.6.3. Example of an outcome; 1.7. Conclusion; 1.8. Bibliography; Chapter 2. 2-D Linear Stochastic Modeling; 2.1. Introduction; 2.2. 2-D ARMA models; 2.2.1. Definition 2.2.2. 2-D ARMA models and prediction supports 2.2.2.1. Causal models; 2.2.2.2. Causal quarter plane model; 2.2.2.3. Causal model whose support is delimited by any two NSHPs; 2.2.2.4. Semi-causal model; 2.2.2.5. Non-causal model; 2.3. L-Markovian fields; 2.3.1. 2-D Markov fields and L-Markovian fields; 2.3.2. 2-D L-Markovian fields and Gibbs fields; 2.4. "Global" estimation methods; 2.4.1. Maximum likelihood; 2.4.1.1. Estimation criteria by supposing the fixed order; 2.4.1.2. Probability criteria "penalized" to estimate the order of the model; 2.4.2. Yule-Walker equations 2.4.2.1. Representation of minimum variance and formulation 2.4.2.2. Non-causal support and L-Markovian fields; 2.4.2.3. Causal support and 2-D AR model; 2.4.2.4. Extension to the 2-D AR non-causal model; 2.4.2.5. Extension to the 2-D ARMA model; 2.4.3. 2-D Levinson algorithm (for the parametric 2-D AR estimation); 2.4.3.1. Recalling the 1-D case; 2.4.3.2. Approach for 2-D causal and non-causal prediction models; 2.4.3.3. Multichannel approach and 2-D QP AR model; 2.4.3.4. Other approaches; 2.5. "Adaptive" or "recursive" estimation methods 2.5.1. Connectivity hypotheses for adaptive or recursive algorithms

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## Sommario/riassunto

This title sets out to show that 2-D signal analysis has its own role to play alongside signal processing and image processing. Concentrating its coverage on those 2-D signals coming from physical sensors (such as radars and sonars), the discussion explores a 2-D spectral approach but develops the modeling of 2-D signals and proposes several data-oriented analysis techniques for dealing with them. Coverage is also given to potential future developments in this area.

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