D-Optimal spatial designs for estimating trend and covariance parameters (extended abstract version)

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Abstract: Outputs from various environmental measurements are often approximated as realizations of correlated random fields. Consequently, the corresponding optimal design questions must cope with the existence and detection of an error correlation structure, issues largely unaccounted for by traditional optimal design theory. Unfortunately, many of the nice features of well established design techniques, like additivity of information matrix, convexity of design criteria, etc., do not carry over to the setting of interest. The aim of this paper is to address these problems and to discuss some particular solutions. An illustrating example of the design of a water-quality monitoring network is provided.