SPACE-VARIANT MODEL FITTING AND SELECTION FOR IMAGE DE-NOISING AND INFORMATION EXTRACTION

Marco Quartulli[1], <u>Matteo Soccorsi</u>[2], Mihai Datcu[2]

(1) Advanced Computer System, 00139 Rome, Italy

(2) German Aerospace Center, 82234 Oberpfaffenhofen, Germany

Abstract

With the growing importance of model-based signal analysis methods, the dependence of their performance on the choice of the models needs to be addressed. Bayesian theory incorporates model selection in a natural and direct way: we apply it to the space-variant choice of the best model in a given reference class in the framework of parameter estimation from noisy data. In particular, we introduce an algorithm for image information extraction and de-noising that is based on a two-level model and estimates local texture Gauss-Markov Random Field (GMRF) parameters and local GMRF model order for incomplete data. Since model selection is based on an approximate numerical computation of the evidence integral, we propose a further selection criterion based on Rate Distortion theory for a cross validation of the results. The link between Bayesian model selection and Rate Distortion is explained. Results are presented on Synthetic Aperture Radar (SAR) images.

Key Words: GMRF, Model Selection, Parameter Estimation, Rate Distortion