Approximation and Optimization in Image Restoration and Reconstruction
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GAUSS-MARKOV-POTTS PRIORS FOR IMAGES IN COMPUTER TOMOGRAPHY RESULTING TO JOINT RECONSTRUCTION AND SEGMENTATION

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In many applications of Computed Tomography (CT), we may know that the object under the test is composed of a finite number of materials meaning that the images to be reconstructed are composed of a finite number of homogeneous area. To account for this prior knowledge, we propose a family of Gauss-Markov fields with hidden Potts label fields. Then, using these models in a Bayesian inference framework, we are able to jointly reconstruct the images and segment them in an optimal way. In this paper, we first present these prior models, then propose appropriate MCMC or Variational Bayesian methods to compute the mean posterior estimators. We finally show a few results showing the efficiency of the proposed methods for CT with limited angle and number of projections.