

Variational Fuzzy Mumford-Shah Model for Image Segmentation

Michael Ng

Department of Mathematics, Hong Kong Baptist University, Hong Kong

In this talk, we discuss a variational fuzzy Mumford-Shah model for image segmentation. The model is based on the assumption that an image can be approximated by the product of a smooth function and a piecewise constant function. Image segmentation is achieved by minimizing the energy functional in terms of membership functions, which take values between 0 and 1 to accommodate the uncertainty of the membership of the pixels, and the partial volume effect in medical images. We show the existence and symmetry of minimizers for the proposed energy minimization problem. The energy can be minimized by an efficient iterative algorithm. Our iterative method has been applied to medical images and natural images with good results. Comparisons with other segmentation methods demonstrate the advantage of our method in the presence of intensity inhomogeneities.