# Universität Basel

Publication

# Discontinuity Preserving Image Registration through Motion Segmentation: A Primal-Dual Approach

Image registration is a powerful tool in medical image analysis and facilitates the clinical routine in several aspects. There are many well established elastic registration methods, but none of them can so far preserve discontinuities in the displacement field. These discontinuities appear in particular at organ boundaries during the breathing induced organ motion. In this paper, we exploit the fact that motion segmentation could play a guiding role during discontinuity preserving registration. The motion segmentation is embedded in a continuous cut framework guaranteeing convexity for motion segmentation. Furthermore we show that a primal-dual method can be used to estimate a solution to this challenging variational problem. Experimental results are presented for MR images with apparent breathing induced sliding motion of the liver along the abdominal wall.