

ACCURATE SURFACE RECONSTRUCTION IN 3D USING TWO-DIMENSIONAL PARALLEL CROSS SECTIONS

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ABSTRACT

In medical imaging or computational biology, it is required to reconstruct a surface from contours in cross sections for visualization and further processing. We propose a method to generate a surface which is smooth enough and exactly passes through contours in each cross section. For smoothness, we define an energy of the surface as the gradient of the normal vector. Also, we express the surface using a level set function, and assign values of level set function on each cross section to make the surface exactly passing through contours. Finally, we get an energy minimization problem with constraints and it can be solved using the augmented Lagrangian method. The solution of the minimization problem is the surface which we look for. Implementation of the algorithm and numerical experiments are presented.