A discrete Ginzburg-Landau functional for regularized image reconstruction

Tomographic imaging is used in many applications, including medical imaging. Under ideal circumstances, an accurate image can be retrieved from high-quality fully sampled data. In practice, however, we can often only acquire noisy subsampled data, making the image reconstruction process more challenging. A promising avenue for increasing the accuracy of the images is to include prior information on expected image structures. One way to encode such prior information is the discrete Ginzburg-Landau (GL) functional, which has gained popularity in image processing applications. In this project, you will explore the possibilities of including the GL function in tomographic image reconstruction. You will work in the interface between Inverse Problems, Calculus of Variations, and Scientific Computing. The project is a collaboration between TU Delft and CWI. The computational imaging group at CWI develops novel algorithms for imaging in various applications and operates a micro-CT scanner. Therefore, there will be opportunities test the methods on experimental data.

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