ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Multiscale Hierarchical Decomposition for blind deconvolution

Tobias Wolf | University of Klagenfurt

Chaired by Elena Resmerita | Department of Mathematics

Wednesday, 29 January 2025 | 10:45–11:30

N.1.44

ABSTRACT

In mathematical imaging, a blurred image is modeled as the convolution of the true image and a blurring kernel. We consider the highly ill-posed problem of blind deblurring, which reconstructs the true image and the blurring kernel from the corrupted observation. One popular strategy for solving this problem is to employ single-step variational models. However, different from the non-blind deconvolution problem (where the blurring operator is known), variational approaches to blind deconvolution require careful modeling of constraints. This is due to non-uniqueness issues introduced by the symmetry of the problem. In this talk, we introduce an adaption of the Hierarchical Multiscale Decomposition Method to the blind deconvolution problem. The method iteratively solves variational problems, creating a sequence of approximate blurring kernels and images. With each step of the method, finer details are added to the reconstructions. We discuss the choice of regularizing functionals, constraints used in the proposed method, and convergence results. To illustrate the behavior of the proposed method, we present numerical examples and compare them with related variational single- and multistep approaches.

We hope to see you there!