

Resolution of reconstruction of functions with nonsmooth edges from discrete 2D Radon transform data

Speaker: Alexander Katsevich, University of Central Florida

Abstract: We consider the reconstruction of a family of functions f_ϵ from their discrete classical 2D Radon transform data. Each f_ϵ has a jump across S_ϵ , which is a curve with limited smoothness (Holder continuous). Each S_ϵ is an ϵ -size perturbation of a smooth and convex curve S . We obtain two different asymptotics of the reconstruction in a shrinking (i.e., of width $\sim \epsilon$) neighborhood of S . We call such asymptotics the Discrete Transition Behavior, or DTB for short. One DTB loses its accuracy as the roughness of S_ϵ increases (the Holder exponent drops). The second DTB remains accurate even for fractal S_ϵ . We will show results of numerical experiments illustrating these behaviours. We will also present latest theoretical results justifying these observations.