

Optimal parameter design for multi-energy CT measurements

Fatma Terzioglu
Department of Mathematics,
North Carolina State University,
Raleigh, NC 27695
e-mail: fterzioglu@ncsu.edu

Abstract: Multi-energy computed tomography (ME-CT) is an x-ray transmission imaging technique that uses the energy dependence of x-ray photon attenuation to determine the elemental composition of an object of interest. Mathematically, forward ME-CT measurements are modeled by a nonlinear integral transform for which no analytical inversion is available. In this talk, I will present some of our recent results on the global injectivity of the forward ME-CT transform and the stability of its inversion. These analyses are useful for designing optimal scan parameters, as I will demonstrate with numerical simulations. This is joint work with G. Bal, R. Gong, and E. Sidky.