

## On artifacts in limited data spherical Radon transform: curved observation surface - DTU Orbit (08/11/2017)

### On artifacts in limited data spherical Radon transform: curved observation surface

We study the limited data problem of the spherical Radon transform in two and three-dimensional spaces with general acquisition surfaces. In such situations, it is known that the application of filtered-backprojection reconstruction formulas might generate added artifacts and degrade the quality of reconstructions. In this article, we explicitly analyze a family of such inversion formulas, depending on a smoothing function that vanishes to order  $k$  on the boundary of the acquisition surfaces. We show that the artifacts are  $k$  orders smoother than their generating singularity. Moreover, in two-dimensional space, if the generating singularity is conormal satisfying a generic condition then the artifacts are even orders smoother than the generating singularity. Our analysis for three-dimensional space contains an important idea of lifting up space. We also explore the theoretical findings in a series of numerical experiments. Our experiments show that a good choice of the smoothing function leads to a significant improvement of reconstruction quality.

### General information

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