AbstractID: 1610 Title: Iterative reconstruction-reprojection for truncated projections

Truncated projections can arise from a detector with limited field of view (LFOV). Truncation artifacts can be reduced with extrapolation methods; however the reconstructed images are often over-corrected or under-corrected. Traditional reconstruction re-projection algorithms are suitable for limited-angle of view, but they often diverge for LFOV. We report an iterative reconstruction re-projection algorithm designed for LFOV. In each iteration, the reconstructed image is re-projected to correct the truncated projections and a constant extrapolation is utilized to reduce the discontinuity at the detector edge. Also, these corrected projections are utilized to reconstruct the next image. Our finding suggests that by multiplying a scale value to the re-projections, the number of iterations could be largely reduced. A minimization process can find the optimal scale values, with which the algorithm converges on the second iteration in the examples tested. The algorithm is tested with Shepp-Logan phantom and parallel-beam simulated projections. Using this approach, the reconstructed image is compared to reconstructions with a filtered-back projection method on data that does not suffer from truncated projections. Using the phantom as the reference, the distance of the former is smaller than 3 times of the distance of the latter. Further reduction in distance can be achieved using a non-interpolation algorithm: modified Hankel transform. Future work includes applying this algorithm to cone-beam CT.