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Title: *The mathematics of computed tomography: inverse problems and the Radon transform*

Abstract: The use of x-ray “slices” to recover the density of a solid object has revolutionized diagnostic methods in medicine. This process is known as Computed Tomography, or CT scanning. A successful combination of the mathematics and the device to perform such a scan resulted in a Nobel Prize in physiology and medicine for two scientists, Cormack and Hounsfield, in 1979. The mathematical problem involved is called an “inverse problem.” Techniques for solving this problem using Fourier transform methods were developed several times in the history of pure mathematics, but were not known by the applied sectors in the U.S. until Cormack re-invented a solution in his paper from 1963. A 1917 paper by the mathematician Johann Radon was later found solving this very problem on a purely theoretical level, and the resulting “Radon Transform” has now become the most widely used method for performing the computations in modern tomographic equipment. The interesting history of this inverse problem along with a little known Soviet solution from 1958 is presented, including an explanation of the mathematics used in each of the three solutions.