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Generalizations of the broken-ray transform and conical differentiation. Preliminary report.

The talk will discuss a new approach to the inversion of the broken-ray transform (BRT) and its generalizations. Such transforms appear in mathematical models of single-scattering optical tomography, various imaging techniques based on Compton scattering effect and some other modalities. We present several new formulas, as well as prove some known results with a new simpler approach. The efficiency of the method is demonstrated on several numerical examples. Using our inversion formula for BRT, we also describe the range of that transform when applied to a fairly broad class of functions. (Received July 23, 2017)