

WHICH FUNCTIONS ARE FRACTIONALLY DIFFERENTIABLE?

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We define a fractional differentiation operator as the inverse to Riemann-Liouville integral operator, and examine the relations of this most natural concept with more popular fractional differentiation operators of Riemann-Liouville and Caputo. Our main result concerns the description of the range of Riemann-Liouville integral operator in the space of continuous functions. As the result we can describe, in particular, the class of functions that are differentiable in the sense of Riemann-Liouville and Caputo.

Also the Abel equation with coefficient function of two variables can be examined on the basis of Riemann-Liouville's operator inversion.