On the composition and neutrix composition of the delta function and powers of the inverse hyperbolic sine function

ABSTRACT

Lets F be a distribution in D' and let f be a locally summable function. The composition F(f(x)) of F and f is said to exist and be equal to the distribution h(x) if the limit of the sequence {Fn(f(x))} is equal to h(x), where Fn(x)=F(x)*δn(x) for n=1, 2, … and {δn(x)} is a certain regular sequence converging to the Dirac delta function. It is proved that the neutrix composition δ[(sinh x+)] exists and for s=0, 1, 2, … and r=1, 2, …, where M is the smallest integer greater than (s−r +1)/r and Further results are also proved.

Keyword: Distribution; Delta function; Composition of distributions; Neutrix; Neutrix limit; Neutrix composition of distributions; 33B10; 46F10