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NEAR-RINGS: ALGEBRA FOR ANALYSIS

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Studying differentiations in near-rings and related structures can have two meanings:

(i) Copying the definitions of differential rings to get differential near-rings, or

(ii) Assuming the sum- product- and chain rules for maps on composition rings.

Both concepts will be described, and composition rings and their history (starting from the 1940s) will be discussed in more detail. Also, we will take a look to “discrete differentiation and integration” in the sense of “Concrete Mathematics” by Graham, Knuth, and Patashnik. It turns out that only the chain rule is causing some trouble there. But, nevertheless, near-ring like structures seem to be the right tool to study things like “exponential elements” or differential and difference equations in an algebraic setting.