Simplifying the evaluation of high order rates of multiplicity

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In a previous work, the authors introduced the concept of the rate of multiplicity of nonlinear equation. Roughly, a rate of multiplicity of order \( p \) is a function \( \mu_p \) such that, close to a root \( x^* \) of \( f(x) \) verifies that:

\[
\mu_p(x - x^*) = m + O((x - x^*)^p),
\]

where \( m \) is the multiplicity of the root. These rates of multiplicity are obtained by means of degrees of logarithmic momentum, implying the evaluation of order \( p + 1 \) derivatives.

In this presentation, we devise a different approach to the rates of multiplicity that does not require the evaluation of higher order derivatives at the expense of increasing the number of evaluations of lower order ones.

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References


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