Review of: "On a New Two Point Taylor Expansion With Applications"

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Potential competing interests: No potential competing interests to declare.

This article is trying to find a new type of 2-point Taylor expansion. The author is discussing the convergence intervals of the two-point Taylor expansion in comparison with those of the single-point Taylor expansion and suggesting the merit of the two-point Taylor expansion by describing that, even if a function contains a singular point, it can be expanded. In addition, the author shows an application of the two-point Taylor expansion to solve an ordinary differential equation.

It is certainly interesting, but the referee wondered what the merit of the two-point Taylor expansion the author exploited is, in comparison with the classical two-point Taylor expansion. Besides, the referee found that the coefficients a_{2m}, a_{2m+1} of the relevant two-point Taylor expansion can be described by the coefficients a_m and b_m of the classical expansion in such a way that

$a_{2m} = b_m (x_0 - x_1), \quad a_{2m+1} = a_m + b_m.$

Then the referee wondered again what the essential difference is between the author's expansion and the classical one. If the author answered these questions in this article, it would be more interesting.

The referee has one more comment on the proof of the uniqueness of the expansion (see the argument from (20) to (23)). The author considered only the linear independence of two polynomials, i.e., $(x - x_0)^m (x - x_1)^m$ and $(x - x_0)^n (x - x_1)^n$, but the referee does not think that it is enough.