Referee report:

High-Order Accurate Finite Difference Schemes Via Optimal Time Step Selection
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submitted to *SIAM Journal on Numerical Analysis*

This manuscript contains a lengthy expository description and select special numerical examples for high order methods based on the idea of choosing time steps in a special way in order to eliminate certain error terms in constant coefficient PDEs. The idea that for special formulations of constant coefficient partial differential equations, certain time step selections might eliminate all or part of the higher order error coefficients is nothing new. In fact, many of the results are a simple rehashing of old ideas.

The only contribution of the paper as far as I can tell is the concept of adding a correction term to the compact stencil scheme as in Sections 2.3, 2.4, 2.5. Overall Section 3 contains a restatement of the main results in Section 2, with a section added on irregular domain problems.

The article actually argues against the utility of the proposed "optimal time step selection" on a couple of occasions, specifically in Section 1.5 and at the top of page 18. "Optimal time step selection" only seems applicable to toy problems whose solutions are easily obtained.

The article is well written and easy to read. However, it is too wordy and padded with needless explanations to merit publication in a scientific journal; perhaps it could be published in a textbook or publication which welcomes expository submissions. It is not clear to me why the article merits a significant contribution to the field of numerical analysis and does not seem promising for the application to interesting applied problems which require significant computational effort. Because of the significant shortcomings of the manuscript, it does not merit publication in *SIAM Journal on Numerical Analysis*.