Review of: "New adaptative numerical algorithm for solving partial integro-differential equations"

Guanqian Wang[1]

1 University of Central Florida

Potential competing interests: No potential competing interests to declare.

In this paper, a numerical method based on orthonormal Bernoulli polynomials is proposed to solve a class of PIDEs (partial integro-differential equations). The paper has four main parts. In the first section, the type of the PIDEs is given with some background. The approximation method (Gauss Legendre quadrature) for the integral part in the PIDEs is also provided in this section. In sections 2 and 3, the setup and some derivations of the numerical methods are given. In section 4, the analysis of the error is provided, and the boundedness of the error is proved. In section 5, several numerical tests are provided; the comparison between the newly proposed method and other methods is given; it is stated that the new method has higher accuracy.

There are a few issues and suggestions regarding this paper:

(1) The lemma 2 does not have a proof or reference. The reference or proof needs to be added.

(2) In the conclusion, the author declares the method can be applied to higher dimensions; there should be an example to showcase the application for higher-dimensional cases and compare with other well-established methods.

(3) The author compared the new method with other methods without any analysis or discussion. If possible, there should be some analysis or at least some discussion regarding the reason why the new method is faster than other established methods.

(4) It has some expression issues. For instance, the author used OBP to denote orthonormal Bernoulli polynomials without reporting it.

(5) It has some display errors. For instance, at the beginning of proof 1, it says "32 reduces to 29"; it should be (32) reduces to (29). Similar errors occurred many times in the following proof. In proof 2, after equation (36), it should be lemma 2, not lemma 31.

(6) It has some grammatical errors. For instance, at the beginning of section 5, it says "considered to shown," which should be "to show."