Review of: "Taylor Series Based Domain Collocation Meshless Method for Problems with Multiple Boundary Conditions including Point Boundary Conditions"

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Potential competing interests: No potential competing interests to declare.

The proposed method aims to solve linear PDEs by using a high-degree polynomial as the trial function. The trial function is enforced to be zero at the boundary by combining it with a complex Taylor expansion of the parametrization of the boundary domains. This allows for the explicit satisfaction of boundary conditions (a similar technique was discussed in earlier works, as seen in Lagaris et al. 1998 for artificial neural networks).

The solution is then determined by solving a linear least squares problem for the coefficients of the Taylor expansion. The author demonstrates good numerical results for simple problems but also includes some difficult domains. However, the work lacks a comparison with other methods, such as FD or FEM (at least for the square domain, this should be done), which are described in the introduction but not utilized.

A comparison with an implicit method for the boundaries (e.g., adding equations collocated on points on the boundaries to satisfy the boundary conditions) is also missing. Additionally, other comparisons with Physics-informed NNs, extreme learning machines, or random projection neural networks are lacking. It is also suspected that some numerical issues can arise for linear problems with sharp gradients and boundary layers (see https://doi.org/10.1016/j.cma.2021.114188). The latter is not discussed and should be investigated.

Moreover, the definition of the function Psi, which is zero at the boundaries and not in the domain, is not unique, and its determination can become laborious for high-dimensional PDEs or more complex boundaries. The introduction of a distance-to-boundary function may be needed.

Finally, the paper could be written more effectively; it requires some grammar and style refinement before publication.