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

Hossein Hosseinzadeh[1]

1 Amirkabir University of Technology

Potential competing interests: No potential competing interests to declare.

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

A numerical method is proposed in this paper to solve PDEs where it mainly depends on boundary collocation points for imposing the boundary condition. The method is an extension of polynomial approximation which it has been considered in the literature widely. The method is described carefully in some sections of this paper and it is applied for several linear equations defined on some regular and un-regular domains. The paper is valuable, however there are some comments which I hope help the author to revise the paper.

1. The formulation of the method is complicated and it can be simplified by imposing the unknown function u as $u=u_1+u_2$ where u_1 only satisfies the boundary condition and u_2 satisfies PDE $L(u)-L(u_1)$ whit zero boundary condition. Then you can reformulate the presented equations based on the new variables.
2. Lagranjian basis functions $l_1, l_2, …, l_n$ are numerically unstable specially when n is large. Chebishev points are usually applied for overcoming the un-stability. Then it is better you also describe more about these basis functions and explain how do you get stable results by these basis functions.
3. Please use three dots instead of many dots which are applied in the equations.
4. You use quadratic function $\theta_k=(x-x_k)^2+(y-y_k)^2$ to find a polynomial function does not vanish at any points except $[x_k, y_k]$. It seems it enriches the stability of $norm$ function. You may define a new $norm$ function which its denominator has lower degree and it is vanished only at the boundary computational points.
5. The mixed boundary condition is omitted in this paper. So please add a new example to show the ability of the method for this kind of boundary conditions if it is possible.

Best wishes