

Over-Range Collocation Method vs. Collocation Method

***Yong-Ming Guo¹, Genki Yagawa²**

¹ Graduate School of Science and Engineering, Kagoshima University, Japan.

² Tokyo University of Science, Japan.

*Corresponding author: guoy@mech.kagoshima-u.ac.jp

To improve the robustness of the collocation method (CM), the positivity conditions are important. For boundary points, however, the positivity conditions cannot be satisfied in general, causing large numerical errors from the boundary points when using the CM.

The over-range collocation method (ORCM) is a new meshless method, in which some points located at the outside of domain of a body under consideration are used. In the ORCM, the above-mentioned issue of the positivity conditions of boundary points in CM can be avoided.

In this paper, a comparison of accuracy between the ORCM and the CM is made. It is shown that the relative errors of the ORCM are smaller than those of the CM for Poisson's equation and Helmholtz's equation with mixed boundary conditions.

Keywords: Meshless methods, Positivity conditions, Collocation methods, Over-Range Collocation Method