

FINDING AN EFFECTIVE SHAPE PARAMETER STRATEGY TO OBTAIN THE OPTIMAL SHAPE PARAMETER OF THE OSCILLATORY RADIAL BASIS FUNCTION COLLOCATION IN 3D

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Communicated by Paul Eloe

ABSTRACT. Recent research into using the Method of Approximate Particular Solutions to numerically solve partial differential equations, has shown promising results. High levels of accuracy can be obtained when implementing this method, however the success of this collocation method is dependent on a shape parameter that is found in nearly all radial basis functions. If the shape parameter is not appropriately chosen, then it can provide an unacceptable result. Two shape parameter strategies are considered, a random variable shape parameter strategy and a leave-one-out cross validation strategy. The main objective of this work is to assess the viability of using these shape parameter strategies with oscillatory radial basis function, and their ability to provide a consistent and accurate approximation.

KEYWORDS: *Numerical solutions of partial differential equations, Oscillatory radial basis functions*

MSC (2010): Primary 65N35

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Received December 20, 2021; revised January 27, 2022.