

# Data Dependent Weights in Discontinuous Weighted Least-Squares Approximation with Anisotropic Support

N. B. Petrovskaya

School of Mathematics, University of Birmingham, Birmingham, B15 2TT, UK

## **Abstract**

Discontinuous weighted least-squares (DWLS) approximation is modification of a weighted least-squares method that requires a local support (a reconstruction stencil) to approximate a function at a given point. A DWLS method is often employed in computational problems where a function is approximated on an irregular computational grid. It has recently been revealed that the method provides inaccurate approximation on irregular grids and conventional weighting of distant points captured by a reconstruction stencil on an irregular coarse mesh does not improve the accuracy of the approximation. Thus in our paper we further investigate the impact of distant points on the accuracy of DWLS approximation and design new weight coefficients for DWLS reconstruction that allow one to obtain more accurate reconstruction results. Our approach is based on a concept of numerically distant points originally developed in author's previous works, as a new weight function calculates the distance between two points in the data space.