Walder, C., B. Schölkopf and O. Chapelle: Implicit Surface Modelling with a Globally Regularised Basis of Compact Support. Proc. *Eurographics*, 10, Blackwell, Oxford (in revision) (09 2006)

Abstract:

We consider the problem of constructing a globally smooth analytic function that represents a surface implicitly by way of its zero set, given sample points with surface normal vectors. The contributions of the paper include a novel means of regularising multi-scale compactly supported basis functions that leads to the desirable interpolation properties previously only associated with fully supported bases. We also provide a regularisation framework for simpler and more direct treatment of surface normals, along with a corresponding generalisation of the representer theorem lying at the core of kernel-based machine learning methods. We demonstrate the techniques on 3D problems of up to 14 million data points, as well as 4D time series data and four-dimensional interpolation between three-dimensional shapes.

The full text is available at
http://www.kyb.mpg.de/publication.html?publ=3958