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Vector field approximation using radial basis functions

Approximation of vector fields from a set of scattered vector data by radial basis functions interpolation methods, have a wide applicability to different fields, like meteorology, fluid mechanics and elasticity. Within the last years, several authors have formulated and analyzed different RBFs interpolation techniques to solve this kind of problems. A major limitation, from the applied point of view, is that these meshfree interpolants have been built by minimizing some particular energy functional defined R^n. Thus in general, no boundary conditions can be incorporated into these numerical approximations. In this talk by using a rather different approach, based on a Lagrange multipliers technique, we present a solution to this problem within the context of RBFs methods. Numerical examples, based on multiquadric kernels, applied to atmospheric reconstruction fields will be presented.

Joint work with D. Cervantes and C. Gout.