Interpolation of scattered data in \mathbb{R}^3 using minimum L_p -norm networks, 1

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We consider the extremal problem of interpolation of scattered data in \mathbb{R}^3 by smooth curve networks with minimal L_p -norm of the second derivative for 1 . The problem for <math>p = 2 was set and solved by Nielson [1]. Andersson et al. [2] gave a new proof of Nielson's result by using a different approach. It allowed them to set and solve the constrained extremal problem of interpolation of convex scattered data in \mathbb{R}^3 by minimum L_2 -norm networks that are convex along the edges of an associated triangulation. Partial results for the unconstrained and the constrained problems were announced without proof in [3]. Here we present complete characterization of the solutions to both the unconstrained and the constrained problems for 1 .

References

- G. M. Nielson. A method for interpolating scattered data based upon a minimum norm network. *Mathematics of Computation*, 40(161):253–271, 1983.
- [2] L.-E. Andersson, T. Elfving, G. Iliev, K. Vlachkova. Interpolation of convex scattered data in ℝ³ based upon an edge convex minimum norm network. *Journal of Approximation Theory*, 80(3):299–320, 1995.
- [3] K. Vlachkova. Interpolation of convex scattered data in \mathbb{R}^3 based upon a convex minimum L_p -norm network. Comptes Rendus de l'Académie Bulgare des Sciences, 45(12):13–15, 1992.