

Nonlinear Approximation - Universality and Stabilization

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Nonlinear approximation concepts e.g. in the format of greedy algorithms or best N -term approximation have gained considerable theoretical and practical importance in a number of different areas such as data compression, statistical estimation and numerical analysis. This talk highlights some recent developments with special emphasis on effects related to “universality” and “stabilization” that are perhaps less evident than complexity aspects. This is exemplified in the context of image compression/encoding, adaptive regression techniques in learning theory and adaptive solvers for operator equations. The common principles working in all these cases are briefly indicated. Universality means here that optimal distortion/complexity rates are obtained for a given model class without any a priori knowledge about (e.g. the smoothness of) the object to be recovered. “Stabilization” means that in situations where conventional discretizations have to satisfy extra compatibility conditions (often complicating the trial spaces) certain nonlinear adaptive solvers ensure the required stability of the discretization in an automatic fashion.