Marc Alexa (TUB), Jürgen Döllner (HPI), Peter Eisert (HUB), Hans-Christian Hege (ZIB), Konrad Polthier (FUB), John Sullivan (TUB)

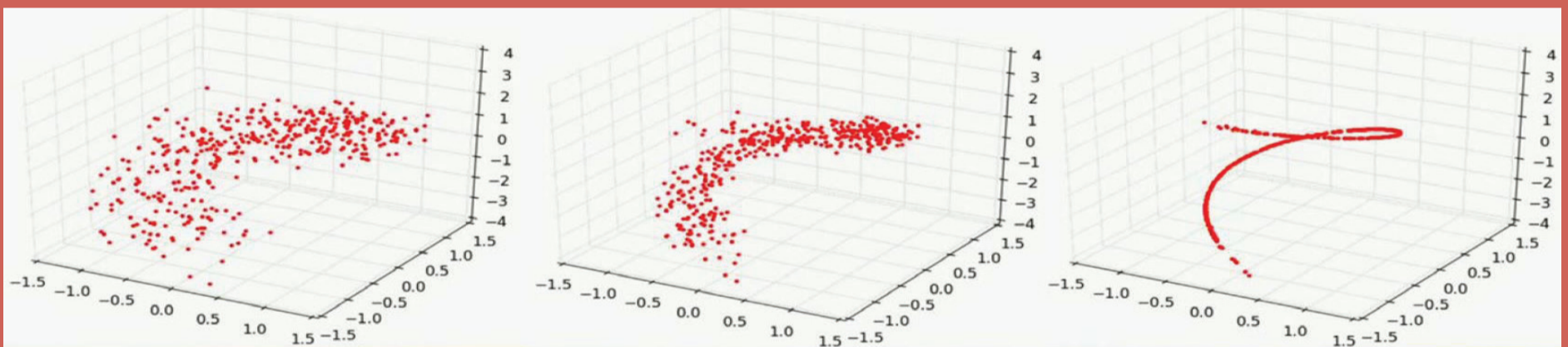# Some Remarks on Multivariate Approximation

David Levin, Professor

Tel Aviv University, Israel

Thursday, July 4th, 2019 at 17:15 h
Zuse-Institut Berlin (ZIB), Takustraße 7, 14195 Berlin
Lecture hall (round building, ground floor)

My talk will present some ideas on scattered data multivariate approximation. I will start by suggesting a graphical visualization of the approximation power of linear bivariate approximation methods. This will lead us to the notion of quasi-interpolation and to the method of Moving Least-Squares. Approximation errors are usually larger near singularities of the approximated function and also near the boundary of the approximation domain. It turns out that by analyzing the approximation errors at the data points we can improve the approximation near singularities and near the boundary.

Other interesting issues are the approximation of low dimensional manifolds, and the approximation of a function over manifolds.

I will present the idea of approximation by projection, first for the approximation of surfaces in 3D, and then for the approximation of general low dimensional manifolds in high dimension. To get a feeling of this approach, please see a short video on approximating a curve in 3D from noisy samples at: https://youtu.be/K_TzGinrexM.

Prof. David Levin is professor emeritus at the Raymond & Beverly Sackler Faculty of Exact Sciences at Tel Aviv University in the School of Mathematical Sciences.
His major research interests are subdivision, moving least squares (MLS), multivariate approximation methods and numerical integration. Many results in the field of MLS are based on his research, which is a cornerstone of modern surface reconstruction methods.
Prof. Levin is visiting Berlin as part of an ongoing collaboration between Tel Aviv University and FU Berlin, which is partly supported by the Minerva foundation and by the SFB/TRR 109 „Discretization in Geometry and Dynamics".

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