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MOX Seminar Series

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Multivariate Splines and Their Applications

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Abstract:

Multivariate splines are piecewise polynomial or rational functions over a collection of polygons. We shall explain some approximation properties of these splines and construction of locally supported basis functions. Then I will explain how to use them for numerical solution of linear and nonlinear partial differential equations and data fitting for statistical analysis. Our approach is based on barycentric coordinates (BB form) and generalized barycentric coordinates (GBC). The smoothness conditions, boundary conditions or interpolatory conditions will be set up as linear constraints when we minimize energy functional associated with the PDE to be solved or data to be fitted. Our approach enables us to use higher order polynomials and the smoothness higher than continuity easily. Several numerical examples of PDE and data fitting will be shown.



Ming-jun Lai:

*Ming-Jun Lai is professor at University of Georgia, Georgia, USA. His main scientific interest are multivariate splines. He is the author of the book, *Spline Functions over Triangulations* (joint with Larry Schumaker), Cambridge University Press, 2007. He has authored more than 100 publications in the fields of Numerical Analysis, Numerical Solution of Partial Differential Equations, Approximation Theory, Compressed Sensing, Computational Optimization, Computer Aided Geometric Design, Mathematical Image Analysis, Multivariate Splines, Wavelet and Frame Analysis.*