Seminar Hora Informaticae   Institute of Computer Science, Prague

Tuesday, March 21, 2023, 14.00 – 15.30 (2 - 3:30 PM) CET

Meeting room 318, Address: Pod Vodárenskou věží 2, Prague 8

ZOOM: https://cesnet.zoom.us/j/95478234977?pwd=dXoyekFHbDJ0MkNrTjVVS3F2STZqUT09

Meeting ID: 954 7823 4977 , Passcode: 712564

Jan Vybíral, Department of Mathematics, FNSPE, CTU:

From ridge functions to neural networks II.

The mathematics of the performance of neural networks in high-dimensional problems presents subtle challenges and many open problems. We discuss identification of a sum of the so-called ridge functions, which in turn corresponds to one layer of an artificial neural network. We show, that identification of such functions can be done by considering certain matrix decomposition as opposed to tensors of the third order used frequently in the literature. Finally, we present a construction of a multivariate Riesz basis of ReLU neural networks, which performs equally well independently on the dimension.

References:

C. Schneider and J. Vybiral, Multivariate Riesz basis of ReLU neural networks, in preparation

M. Fornasier, J. Vybiral and I. Daubechies, Robust and resource efficient identification of shallow neural networks by fewest samples Information and Inference: a Journal of the IMA, 10(2), June 2021, 625-695

S. Mayer, T. Ullrich, and J. Vybiral Entropy and sampling numbers of classes of ridge functions Constructive Approximation 42 (2) (2015), 231-264

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Jan Vybíral (https://people.fjfi.cvut.cz/vybirja2/cv.pdf**)** is affiliated with the Department of Mathematics, Faculty of Nuclear Sciences and Physical Engineering of the Czech Technical University in Prague. His main research interests are high-dimensional approximation theory, random matrix theory, information-based complexity, and computational mathematics.