Matrix product states for continuous functions

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Abstract:
Low-rank matrix product states (MPS) provide computational speed-up to exponentially hard problems. In this talk, I will explain how to apply this idea to fit functions of continuous variables. As an introduction, I will show that there are indeed some functions known to have explicit low-rank MPS representations. Then, for functions without analytical MPS expression, I will demonstrate how to construct them via numerical means. Low-rank MPS can offer many advantages to manipulate functions over traditional finite difference methods. I will showcase applications, such as global optimization problems and solving differential equations.