**Learning the solution of differential equations by sparse high-dimensional approximation**

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Special session: Function recovery and discretization problems

We use a dimension-incremental method for function approximation in bounded orthonormal product bases to learn the solutions of various differential equations. Therefore, we deconstruct the source function of the differential equation into parameters like Fourier or Spline coefficients and treat the solution of the differential equation as a high-dimensional function w.r.t. the spatial variables, these parameters and also further possible parameters from the differential equation itself. Finally, we learn this function in the sense of sparse approximation in a suitable function space by detecting coefficients of the basis expansion with largest absolute value. Investigating the corresponding indices of the basis coefficients yields further insights on the structure of the solution as well as its dependency on the parameters and their interactions.