

Data-Driven Generalised eigenvalue problems in Tensor Train Format

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This poster introduces an approach to solving the Generalised eigenvalue problems arising from the tensor-based Extended Dynamic Mode Decomposition (EDMD). The Extended Dynamic Mode Decomposition (EDMD) is a data-driven technique used for approximating the Koopman operator, a linear operator which is particularly useful for understanding the behavior of nonlinear dynamical systems from observational data. But solving high-dimensional eigenvalue problems is very challenging in terms of storage consumption and computational robustness. So, we are presenting EDMD as a Tensor (a multidimensional generalisation of matrices) based method. Tensors arise from a multi-linear structure; for example, when constructing a large basis set of from products of lower-dimensional functions. We are using the Tensor Train (TT) format which is one of the promising candidates for approximating high-dimensional tensors by low-rank decompositions.

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