

The p-AAA algorithm for data driven modeling of parametric dynamical systems

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The AAA algorithm has become a popular tool for data-driven rational approximation of single variable functions, such as transfer functions of a linear dynamical system. In the setting of parametric dynamical systems appearing in many prominent applications, the underlying (transfer) function to be modeled is a multivariate function. With this in mind, we develop the AAA framework for approximating multivariate functions where the approximant is constructed in the multivariate Barycentric form. The method is data-driven, in the sense that it does not require access to full state-space data and requires only function evaluations. We discuss an extension to the case of matrix-valued functions, i.e., multi-input/multi-output dynamical systems, and provide a connection to the tangential interpolation theory.

This is a joint work with Andrea Carracedo Rodriguez and is available as <https://arxiv.org/abs/2003.06536>