Abstract Submitted
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Higher-order system analysis WOUTIJN BAARS[1], CHARLES TINNEY[2], The University of Texas at Austin — A higher-order system identification technique will be presented in the context of stochastic estimation, as it is quite useful in the field of (experimental) fluid dynamics. This higher-order spectral stochastic estimation technique was originally developed in the context of Systems Identification. It is shown how this technique defaults to spectral Linear Stochastic Estimation when only the linear kernels are computed. In case of higher-order computations, the system is constructed using a frequency-domain Volterra series and is expressed as a linear algebraic system of equations that are solved for the linear and higher-order transfer kernel coefficients. In the trade-off to seek for higher-order transfer kernels, the increased complexity restricts the analysis to single input/single output. POD based methods can be inserted to alleviate this void whereby time-varying POD coefficients of the output are estimated from POD coefficients of the input. Strengths and weaknesses of the current implementation of this technique will be discussed using simulated data and an application of this method to an axisymmetric jet flow to identify coherent turbulent structures.

[1]PhD student
[2]Assistant Professor

Woutijn Baars
The University of Texas at Austin

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