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Describing Functions (DF) framework for modeling non-linearities

The main contribution of this work is to provide new insights for capturing the behavior of hard nonlinearities beyond the classical weakly nonlinear *Volterra input-output map* (VIOMAP). The VIOMAP approach is a special polynomial map unable to capture hard non-linearities due to the ill-conditioned high polynomial terms. On the other hand, the *describing functions* (DF) framework allows more general map constructions such as rational, which makes the hard non-linear behavior more stable for approximation. Data-driven methods as the *Loewner framework* (LF) can benefit from that concept.

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