Project - Nonlinear System identification

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I. System Description

The device studied throughout this project is a linear system with a static nonlinear feedback loop. It has a single input and a single output and the feedback is known to follow the input-output relation given by

$$y(t) = u^3(t). \tag{1}$$

The objective will be to identify the linear part of the system and to have a measure of the nonlinearity and noise levels. The knowledge of (1) will not be used.

The measurement device (referred to as the *PXI setup*) allows to send only multisines and their RMS value cannot exceed 1 V. Its ADCs have a range that can be chosen and can sample at high frequencies (> 1 GHz).

This report deliberately focusses on the theoretical points and the results rather than the implementation because the Matlab™ scripts and the measured data are available on GitHub[1].

[1] https://github.com/e-colot/Nonlinear-identification