MIEET – 2019/2020

Identificação de Sistemas – System Identification

Work Assignment No. 02

Introduction

A nonlinear dynamic system, of input $x(t)$ and output $y(t)$, is measured through the MATLAB function:

$$y = \boldsymbol{SystemWA02}(x, t, NumMec)$$

which is found in Moodle (the usage of this function is obtained by simply typing the function's name in the MATLAB command line).

The objective of this work is to design and generate a set of graphics which can be used to evaluate the behavior of this system (i.e., to build a non-parametric model based on graphical representations).

Task Description

Noticing that this system is dynamic and nonlinear, design a way to obtain a set of graphics which reveal, in part, the behavior of the system under analysis. This behavior should be characterized through the system's response to two-tone signals, which are suitable to evaluate both the nonlinear behavior (due to the distortion that appears at the output) and also the dynamic behavior. Provide a clear description of the tests that you consider to be suitable for this characterization, and also describe the interpretation given to the graphical information that is presented in such non-parametric model. The level of automation considered in the system's characterization procedure will be appreciated.

At the end of the work, elaborate a report where you clearly:

- define the problem at hand;
- define the strategy you have considered for the characterization of the system;
- present the procedure implemented to characterize the system;
- describe the information represented in the model, and it should be interpreted;
- present your comments and conclusions about the above procedures.

This report is limited to a maximum of 3 pages (excluding the cover, but including any other possible parts), and will be the only material that you will deliver. The deadline for submitting this report is the 23h59 of November 24, 2019. You must submit it by e-mail (to trcunha@ua.pt) in PDF format only.