Computación y Sistemas
ISSN: 1405-5546
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Identificación de un Sistema de Fijación de Tornillos con Ruido en Mediciones
Computación y Sistemas, vol. 10, núm. 3, enero -marzo, 2007, pp. 285-300
Instituto Politécnico Nacional
Distrito Federal, México

Available in: http://www.redalyc.org/articulo.oa?id=61509806

Abstract

System identification is a fundamental previous task to system control. State of art in system identification has allowed to solve the problem of knowing the system model with high precision, considering that the system variables measurements are made without error; or making some filtering treatment. However, there are cases where, even there exist noises in measurements, the filtering treatment is not possible, or where errors are attributable to the model. Many of the efforts made to solve this problem are around of the idea of diminishing the noise effects over the interest signals, and then depreciate the residual noise. But there are applications where even after diminishing the effects is impossible to ignore its influence. As an example, it can be mentioned the case of unstable systems, where is necessary a control action while the identification is carried out, and the presence of a feedback signal leads to have biased estimators. In this work, a solution to the problem of system identification with measurement noises is presented, by means of a modification of classical identification Extended Least Squares scheme (ELS), called Over-Extended Least Squares (OELS), proposed by the author in his PhD thesis, it is proved under certain conditions and it is applied to identify a screw fastener system, which is constantly submitted to measurement noises, as much by the form the measurement is made, as by external electromagnetic influences. Results are obtained in simulation, but are based on directly acquired data from the fastener system, and show the reliable performance of the OELS algorithm.

Keywords

Identification, Control, stochastic, noises in measurements, noisy measurements, Least Square, Extended Least Square, Over-Extended Least Square, fastener system.