Identification and control OF SISO systems using relay and subspace method

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**Abstract**

In the present investigation, a new closed loop identification method for the single output and single output (SISO) systems & control of identified SISO systems has been proposed. For identification of SISO system, relay feedback & subspace identification methods have been employed simultaneously to determine the system transfer function matrix by state space model using N4SID algorithm from system identification toolbox. The proposed identification method requires neither priori knowledge to carry out identification unlike subspace identification method nor involves excessive calculations unlike auto tuning using relay-feedback method. Examples based on stable transfer functions are considered to observe the efficacy of the proposed method. The main advantage of this design method is its simplicity and reduction of excessive calculations, when compared to other methods in the literature. A new method has been proposed in order to identify and control the commonly used SISO processes such as FOPTD and SOPTD in process control applications. Different bench mark examples from the literature have been considered for the illustration of the proposed method. A comparison between the identified process and actual was done and found that the results are in good agreement. .

*Keywords*: FOPTD, SOPTD, Relay-Feedback, Subspace Identification, System Identification, SISO, PID-Controller, N4SID.

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