

Kayran, Ahmet H.; Ekşioğlu, Ender M.

Nonlinear system identification using deterministic multilevel sequences. (English)

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Summary: A new exact method of measuring the Volterra kernels of finite-order discrete nonlinear systems is presented. The kernels are rearranged in terms of multivariate cross-products in vector form. The one-, two-, . . . , and l -dimensional kernel vectors are determined using a deterministic multilevel sequence with l distinct levels at the input of the system. It is shown that the defined multilevel sequence with l distinct levels is persistently exciting for a truncated Volterra filter with nonlinearities of polynomial degree l . Examples demonstrating the rearrangement of the Volterra kernels and a novel method for estimation of the kernels are presented. Simulation results are given to illustrate the effectiveness of the proposed method.

MSC:

93B30 System identification

90C10 Integer programming

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