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IDENTIFICATION OF ERRORS-IN-VARIABLES MODELS FROM QUANTIZED INPUT-OUTPUT MEASUREMENTS VIA BIAS-COMPENSATED INSTRUMENTAL VARIABLE TYPE METHOD

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Abstract. *In this paper, the method of consistent estimation of the errors-in-variables (EIV) models based on the quantized input-output measurements is studied. A new bias-compensation based method, named the bias-compensated instrumental variable type (BCIV-type) method, has been proposed for the quantized EIV models identification. The proposed BCIV-type method is based on compensation of asymptotic bias on the instrumental variable type (IV-type) estimates by making use of noises variances and quantization errors variances estimates. It is demonstrated that the proposed method can give consistent parameter estimate via simulation results.*
Keywords: Identification, Errors-in-variables models, Quantization

1. **Introduction.** Recently, system identification method for linear discrete-time systems based on the quantized input-output data have received much attention because of its important applications in digital control system, signal processing and nano-technology [1, 2, 3, 4].

Several methods have been proposed to estimate unknown parameters of linear discrete-time systems based on the quantized input-output data. Okao et al. [1] have proposed an identification method for nano control. This method is based on a numerical optimization problem that minimizes the sum of squared errors where the system parameters and the quantization errors are decision variables, and it has been extended by Okada et al. [2] to the identification problem from saturated input-output data. However, this approach requires an extensive computing time to solve the optimization problem. Moreover, since the measurement noises are not taken into account, this approach is not suitable when the measurement noises are present.