Prediction and Monitoring of Nonlinear Biological Processes Using Modified Fuzzy Partial Least Squares

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A new nonlinear partial least squares model, which uses the adaptive neuro-fuzzy inference system (ANFIS) for the inner regression in the partial least squares (PLS) method, was proposed. This new algorithm is called as adaptive neuro-fuzzy inference system of partial least squares (ANFIS-PLS). ANFIS is very effective to capture the nonlinear relationship that exists between the input score and the output score when modeling the PLS inner regression. The prediction and monitoring performances of the proposed ANFIS-PLS were tested in a simulation benchmark model of nonlinear biological wastewater treatment process. Acknowledgement: Financial supports from Korea Science and Engineering Foundation (KOSEF) (Grant No. KRF-2009-0076129) [funded by the Korea government (MEST)], the National Research Foundation of Korea (NRF) grant funded by the Korea government (MEST) (No. 2011-0001031), the Natural Science Foundation of Guangdong Province (No. S2011040000389), and the Seoul R&BD Program (CS070160) are gratefully acknowledged.