

EXTENDED KALMAN FILTER FOR INVESTIGATION OF INHOMOGENEOUS DYNAMICS IN INDUSTRIAL BIOREACTORS

— research paper —

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Abstract: A stepwise software sensor (SS) based on extended Kalman filter (EKF) is proposed. For monitoring scheme derivation, two methodologies concerning SS with a cascade structure and a novel formalization of kinetics are used. The Kalman's filtering approach is applied for state and parameter estimation under assumption that the dry cell weight concentration is measured on-line only. The estimation algorithm is demonstrated using experimental data of fed-batch cultivation of a non-sporulating *B. subtilis* mutant realized in two compartment reactor as scale-down process simulator. The measurements obtained by new EKF-SS could improve the process monitoring and studying process dynamics.

Keywords: Extended Kalman Filter, cascade monitoring scheme, industrial scale fed-batch processes, scale down reactor

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