I-TMP01

International Poster Session

13:00 – 13:50   I-TMP-13

Extended Kalman Filter Approach to Dynamic Electrical Impedance Tomography with Internal Electrodes

S.I. Kang, K.Y. Kim, H.C. Kim M.C. Kim, S. Kim, H.J. Lee, and Y.J. Lee (Cheju Univ.),
W.C. Cho (Kyungdo Provincial College),

Impedance tomography (EIT) is a relatively new imaging modality in which the internal impedivity distribution is reconstructed based on the known sets of injected currents through the electrodes and induced voltages on the surface of the object. We describe a dynamic EIT imaging technique for the case where the resistivity distribution inside the object changes rapidly within the time taken to acquire a full set of independent measurement data. In doing so, the inverse problem is treated as the nonlinear state estimation problem and the unknown state (resistivity) is estimated with the aid of extended Kalman filter in a minimum mean square error sense. In particular, additional electrodes are attached to the known internal structure of the object ...

13:00 – 13:50   I-TMP-15

Robust Wavelet Kalman Filter

Taehoon Lee. Jinbae Park (Yonsei Univ.),
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Since Kalman filter and wavelet transform techniques are both suitable for a nonstationary process, wavelet Kalman filter was proposed and applied to various industrial fields. However, the wavelet-Kalman filter subjected to model uncertainty with nonstationary process has not been considered. Thus, the robust wavelet-Kalman filter method is proposed in this paper. The proposed method can prevent the degradation of filter performance when parameter uncertainty exists in both the state and measurement matrices and preserve the merits of the standard Kalman filter in the sense that it produces optimal estimates. A simple example shows that the proposed approach outperforms the standard Kalman filter and the nominal wavelet-Kalman filter.

13:00 – 13:50   I-TMP-14

Output-Feedback Control of Uncertain Nonlinear Systems Using Adaptive Fuzzy Observer with Minimal Dynamic Order

Jang-Hyun Park, Sung-Hoe Huh, Gwi-Tae Park
(Korea Univ.)

This paper describes the design of an output-feedback controller based on an adaptive fuzzy observer for uncertain single-input single-output nonlinear dynamical systems. Especially, we have focused on the realization of minimal dynamic order of the adaptive fuzzy observer. For the purpose, we propose a new method in which no strictly positive real(SPR) condition is needed and combine dynamic rule activation scheme with on-line estimation of fuzzy parameters. By using proposed scheme, we can reduce computation time, storage space, and dynamic order of the adaptive fuzzy observer...