
Title: Modeling, Estimation and Control of the Anaesthesia Process

Authors: Ioana Nanullcu, Efstratios N. Pistikopoulos

PII: S0098-1354(17)30072-8
DOI: http://dx.doi.org/doi:10.1016/j.compchemeng.2017.02.016
Reference: CACE 5719

To appear in: *Computers and Chemical Engineering*

Received date: 30-9-2016
Revised date: 27-1-2017
Accepted date: 6-2-2017

Please cite this article as: Nax219;cu, Ioana., & Pistikopoulos, Efstratios N., Modeling, Estimation and Control of the Anaesthesia Process.*Computers and Chemical Engineering* http://dx.doi.org/10.1016/j.compchemeng.2017.02.016

# Modeling, Estimation and Control of the Anaesthesia Process[1]

Ioana Naşcu[a] and Efstratios N. Pistikopoulos[a,]*

[a] Texas A&M Energy Institute and Artie McFerrin Department of Chemical Engineering, Texas A&M, College Station, TX, USA

*Corresponding author Tel.: +19794580259, email address: stratos@tamu.edu

Highlights

- • A mathematical model for the drug distribution and drug effect of intravenous anaesthesia was discussed.
- Different estimation techniques have been designed, implemented and tested: Kalman filter, offline moving horizon estimation and online moving horizon.
- The state estimators have been implemented simultaneously with mp-MPC and simulated comparatively in the induction and maintenance phases of intravenous anaesthesia, both with and without noise influencing the output.
- The developed strategies successfully address two of the main challenges in the control of the intravenous depth of anaesthesia: nonlinearity and inter-and intra- patient variability.

[1] A tribute to Prof. Rafiq Gani for his intellectual leadership in Process Systems Engineering