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Title:
A Nonlinear Autoregressive Exogenous Neural Network (NARX) Model for the Prediction of the pH Neutralization Process for Palm Oil Mill Effluent

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Full text link:
Publisher : https://link.springer.com/chapter/10.1007/978-981-19-3923-5_45

Scopus preview:
https://www.scopus.com/record/display.uri?eid=2-s2.0-85135031209&doi=10.1007%2f978-981-19-3923-5_45&origin=inward&txGid=d04d9ec7f718f3bcdec1ccbfc445938b

Abstract:
This paper introduces a Nonlinear Autoregressive Exogenous Neural Network (NARX) to predict the pH value of the Palm Oil Mill Effluent (POME). NARX is a computing tool that is widely used for nonlinear time series problems, the techniques that can predict efficient and good performance. In this paper, the pH neutralization process is a MISO (Multiple Input Single Output) systems, the inputs of which are the dosing stroke rates of acid and base, and the output value is the pH value. The neural network was built and trained using the experimental data collected in an open-loop test. The neural network structure for modeling the pH neutralization was identified and the training and validation of the neural network structure were analyzed. The result showed that the NARX modeling was able to predict the pH based on the acid and base dosing stroke rate with an overall regression of 0.9934 and MSE values of 0.000924197.