Accepted Manuscript

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PII: S1385-8947(16)30964-0
DOI: http://dx.doi.org/10.1016/j.cej.2016.07.018
Reference: CEJ 15467

To appear in: *Chemical Engineering Journal*

Received Date: 27 April 2016
Revised Date: 1 July 2016
Accepted Date: 5 July 2016

Please cite this article as: C. Foscoliano, S. Del Vigo, M. Mulas, S. Tronci, Predictive control of an activated sludge process for long term operation, *Chemical Engineering Journal* (2016), doi: http://dx.doi.org/10.1016/j.cej.2016.07.018

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Predictive control of an activated sludge process for long term operation

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Abstract

The application of a multivariable predictive controller to an activated sludge process is discussed in this work. Emphasis is given to the model identification and the long term assessment of the controller efficiency in terms of economical and environmental performances. A recurrent neural network model is developed for the identification problem and the dynamic matrix control is chosen as suitable predictive control algorithm for controlling the nitrogen compounds in the bioreactor. Using the Benchmark Simulation Model No.1 as virtual platform, different predictive controller configurations are tested and further improvements are achieved by controlling the suspended solids at the end of the bioreactor. Based on the simulation results, this work shows the potentiality of the dynamic matrix control that together with a careful identification of the process, is able to decrease the energy consumption costs and, at the same time, reduce the ammonia peaks and nitrate concentration

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