

Proposal for modelling and numerical simulation with SCILAB for learning the continuous and discontinuous dynamics of biological and anaerobic digesters

F.A. Leon^{a,*}, A. Ramos Martin^a, S. Brito Espino^b, C. Mendieta Pino^a,
Tania Garcia-Ramirez^a

^aDepartamento de Ingeniería de Procesos, Universidad de Las Palmas de Gran Canaria, 35017, Campus Universitario de Tafira, Spain, emails: federico.leon@ulpgc.es (F.A. Leon), alejandro.ramos@ulpgc.es (A. Ramos Martin), carlos.mendieta@ulpgc.es (C. Mendieta Pino), tania.garcia106@alu.ulpgc.es (T. Garcia-Ramirez)

^bInstituto Universitario de Investigación en Estudios Ambientales y Recursos Naturales, Universidad, de Las Palmas de Gran Canaria, 35017 Campus Universitario de Tafira, Spain, email: saulo.brito09@gmail.com

Received 14 October 2020; Accepted 24 June 2021

ABSTRACT

This article presents a proposal for modelling and numerical simulation with SCILAB with the aim of learning the continuous and discontinuous dynamics of anaerobic biological digesters. The objective is for the proposed design to be used in relevant Bachelor's and Master's degree course topics related to the area of environmental technology. The design is characterised by its versatility of the use in different situations and its employment of free and open-source tools. This latter aspect is an important characteristic as it allows the design to be modified quickly by students or teachers, depending on future needs. Some example simulation results are shown of the dynamic response of both continuous and discontinuous operation according to predefined operation specifications. By demonstrating these simulations, the design can be used to understand and learn the proposed objective.

Keywords: Biological kinetics; Simulation; Model; Numerical method

* Corresponding author.