ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE
April 23-24-25, 2026 | Marrakech, Morocco

Stability Analysis of Fast Food Consumption Dynamics Using a Fractional-Order Framework

Communication Info

Authors:
Issam SAHIB[1]
Mohamed BELAM[1]
Abderrahim LABZAI [2]

[1] Department of Mathematics and Computer Science, Laboratory of Advanced Research in Industrial and Logistic Engineering (LARILE), Applied Mathematics Team, ENSEM Hassan II University of Casablanca, Morocco
[2] Laboratory of Analysis Modeling and Simulation Department of Mathematics and Computer Science, Faculty of Sciences Ben M'sik Hassan II University of Casablanca, Morocco

Keywords:
(1) Control optimal
(2) Matlab
(3) Fractional-Order

Abstract

In this research, we propose a novel fractional-order model, referred to as PLSCQ, which is designed to capture the dynamics of fast food onsumption and its impact on both health and social behavior. The model incorporates the Caputo derivative and classifies individuals into five distinct categories: potential fast food consumers P , moderate consumers L, excessive consumers S, individuals affected by obesity C, and those who have ceased consuming fast food Q. These categories encompass the full range of fast food consumption behaviors, from those who may potentially consume it to those who have experienced its detrimental consequences, such as obesity, cardiovascular diseases, and social problems like accidents and violence associated with unhealthy eating habits.

References

[1] A. Atangana, Application of fractional calculus to epidemiology. In: C. Cattani, H.M. Srivastava, X.J. Yang (eds.), Fractional Dynamics, pp. 174–190, Walter de Gruyter, Warsaw, 2015.
[2] L. Jodar, F. J. Santonja, and G. Gonzalez-Parra, Modeling dynamics of infant obesity in the Region of Valencia, Spain. Computers and Mathematics with Applications, vol. 56, no. 3, p. 679, 2008.
[3] J. P. La Salle, *The Stability of Dynamical Systems*. SIAM, 1976.