MATH MODEL RESEARCH GROUP

DEPARTMENT OF MATHEMATICS

FEDERAL UNIVERSITY OF TECHNOLOGY (FUT), MINNA, NIGERIA

BOOK OF ABSTRACTS

for the

International Conference on MATHEMATICAL MODELLING, OPTIMIZATION AND ANALYSIS OF DISEASE DYNAMICS (ICMMOADD 2024)

HYBRID (VIRTUAL & PHYSICAL)

Theme:

CONTEMPORARY ISSUES ON THE CONTROLS OF DISEASES EPIDEMICS AND PANDEMIC

DATE: Thursday 22nd February, 2024 **TIME:** 10:00am Prompt

VENUE: Department of Mathematics, Federal University of Technology Minna, Nigeria

PROFESSOR N. I. AKINWANDE FNMS

Convener

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B15: Analytical Study of Temperature–Dependent Thermal Conductivity in Convective Drying of Food Material

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Abstract

The effect of temperature-dependent thermal conductivity on the convective drying of food materials is examined in this study. With the use of the perturbation approach and the Eigen-function expansion technique, the governing equations have been decoupled and solved. Graphs were created to show how the dimensionless parameters affected the temperature and moisture concentration profile. It is important to note that whereas moisture concentration rises with an increase in pellet mass number, the temperature rises with an increase in pellet energy number. Furthermore, it becomes apparent that the moisture concentration drops as the reference velocity rises without affecting the temperature profile.

Keywords & Phrases: Drying, Eigen function expansion technique, food, temperature, perturbation

B16: Mathematical Analysis of Wood Pyrolysis and Combustion

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Abstract

This paper analyses the wood pyrolysis and combustion. The partial differential equations governing the wood pyrolysis and combustion were non-dimensionalized using some dimensionless quantities. The dimensionless equations were decoupled using perturbation method and solved using Olayiwola's Generalized Polynomial Approximate Method (OGPAM). The influences of wood geometry, n on temperature distribution have been analysed. The results obtained revealed that the magnitude of temperature in the wood for the slab particle is very large compare to the cylindrical and spherical particles.

Keywords & Phrases: Biomass, combustion, OGPAM, pyrolysis, wood, wood geometry.