Contribution ID: **47** Type: **not specified**

Temperature oxidation of double combustible reaction and thermal ignition in a concentric cylinder with diverse boundary constraints

Monday, 27 May 2024 16:05 (10 minutes)

Chemical species undergoing spontaneous reactions and temperature oxidation of materials are useful in explosion safety, propulsion detonation and chemical synthesis. Thus, this study considers the dynamics of temperature oxidation of a two-step exothermic combustion and thermal ignition in a concentric isothermal cylinder with diverse boundary constraints. With constant thermal reactant conductivity, a time-dependent partial derivative model is developed to give insight into the chemistry of the branch chain reaction, pre-exponential factor, Arrhenius kinetic, and critical behaviour of the system. A finite semi-discretization difference method is used to investigate the various boundary conditions' impact on the thermal distribution, stability and ignition of the homogenous species reactant. The outcomes show the momentous effects of mixed conditions on the oxidation process, ignition mechanism and thermal behaviour within a concentric cylinder. Hence, this enhances safety protocol and facilitates combustion optimization processes in thermal engineering applications.

Primary author: Dr SALAWU, S. O. (Bowen University, Iwo)

Co-author: FATUNMBI, Ephesus (Federal Polytechnic, Ilaro)

Presenter: Dr SALAWU, S. O. (Bowen University, Iwo)

Session Classification: Technical session 1

Track Classification: Mathematics: Applied mathematics