

The aim of our work is to contribute to the analysis of the structure of laminar premixed Methane-Air flames using two methods. This allows us to validate the chemical mechanisms, to know the fine structure of the flame front and to get, for a given pressure and temperature of fresh gases, the speed and the mass fractions of all chemical species of the combustion reaction. The first method is based on controlling combustion parameters of laminar premixed flame. The numerical resolution strategy used consist in the discretization of the balance equations completed by the transport properties and the thermodynamic variables expressions, as well as the kinetic mechanisms concepts of chemical reactions and boundary conditions, using the first-order finite difference spatial scheme technique. The final solution is obtained, thereafter, iteratively using a recursive method. The calculations stop when equilibrium is reached. The second method consists in the use of FDS (Fire Dynamics Simulator) in order to simulate the propagation speed of the flame for different equivalence ratio in the cylindrical combustion chamber. This geometry is used by Tahtouh et al. (2009), and Bouvet et al. (2010) in their experimental devices for calculating the flame velocity. This study examines the influence of temperature variation of unburned gases on the structure of the flame front, as well as the effect of equivalence ratio on the flame front speed, combustion products and pollutants formation that allows us to deduce which parameters ensure higher efficiency with less fuel consumption and fewer pollutants