

The physical and mathematical model used in the monograph, which gives a rigorous description of the main processes of heat and mass transfer in combustion chambers, and the method of constructing a geometric model of a real combustion chamber in combination with modern computing technologies, using capabilities of modern supercomputers, enable us to carry out a comprehensive study of all characteristics of the solid fuel combustion process in a rather short period of time.

SYMBOLES AND ABBREVIATIONS

\( V \) – volume, \( m^3 \)
\( \rho \) – density, \( kg/m^3 \)
\( S \) – source member
\( \phi \)
\( p \) – pressure, Pa
\( \tau_{ij} \) – viscous stress tensor
\( x, y, z \) – coordinates
\( \phi \) – generalized transport variable
\( \Gamma \) – generalized exchange coefficient
\( \delta_{ij} \) – Kronecker symbol
\( m \) – mass, kg
\( T \) – temperature, \( ^\circ C(K) \)
\( h \) – specific enthalpy, \( kJ/kg \)
\( k \) – kinetic energy of turbulence, \( m^2/s^2 \)
\( K_{abs} \) – optical absorption coefficient, \( 1/m \)
\( D \) – diffusion coefficient, \( m^2/s \)
\( e \) – the rate of dissipation of turbulent kinetic energy, \( m^2/s^3 \)
\( \mu \) – dynamic viscosity, \( kg/m.s \)
\( C_1, C_2, C_3 \) – empirical constants of the turbulence model
\( \sigma \) – stoichiometry coefficient
\( d \) – particle diameter (m)
\( E_a \) – activation energy (\( J/mol \))
\( k_d \) – diffusion coefficient
\( k_c \) – chemical velocity coefficient
\( S_{err} \) – total external surface per unit mass of the coke particle, \( m^2 \)
\( Q_{chem} \) – energy released in a chemical reaction
\( I_\nu \) – intensity of radiation, \( kW/m^2 rad \)
\( \Omega \) – solid angle, \( rad \)
\( \Theta \) – flat angle, degree
\( Pr \) – Prandtl number
\( Ma \) – Mach number