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Droplets"; "3.2 Radiative Heating"; "3.2.1 Basic Equations and Approximations"; "3.2.2 Mie Theory"; "3.2.3 Integral Absorption of Radiation in Droplets"; "3.2.4 Geometric Optics Analysis";
 "References"; "4 Heating and Evaporation of Monocomponent Droplets"; "4.1 Empirical Correlations"; "4.2 Classical Models";
 "4.2.1 Maxwell and Stefan--Fuchs Models"; "4.2.2 Abramzon and Sirignano Model"; "4.2.3 Yao, Abdel-Khalik, and Ghiaasiaan Model";
 "4.2.4 Tonini and Cossali Model"; "4.3 Effects of Real Gases"; "4.4 Effects of the Moving Interface"; "4.4.1 Basic Equations and Approximations"; "4.4.2 Solution When $R_d(t)$ Is a Linear Function";
 "4.4.3 Solution for Arbitrary $R_d(t)$ but $T_d(0) = \text{const}$ "; "4.4.4 Solution for Arbitrary $R_d(t)$ and $T_d(0)$ "; "4.4.5 Results"; "4.5 Modelling versus Experimental Data"; "References"; "5 Heating and Evaporation of Multicomponent Droplets"; "5.1 Background"; "5.2 Bicomponent Droplets"; "5.2.1 Analytical Solutions to the Species Equation"; "5.2.2 Analysis of the Results";
 "5.3 Quasidiscrete Model"; "5.3.1 Description of the Model"; "5.3.2 Application to Diesel and Gasoline Fuel Droplets"; "References"; "6 Kinetic Modelling of Droplet Heating and Evaporation"; "6.1 Early Results"; "6.2 Kinetic Algorithm: Effects of the Heat and Mass Fluxes";
 "6.2.1 Boltzmann Equations for the Kinetic Region"; "6.2.2 Vapour Density and Temperature at the Boundaries"; "6.3 Approximations of the Kinetic Results"; "6.3.1 Approximations for Chosen Gas Temperatures"; "6.3.2 Approximations for Chosen Initial Droplet Radii";
 "6.4 Effects of Inelastic Collisions"; "6.4.1 Mathematical Model"; "6.4.2 Solution Algorithm"; "6.5 Kinetic Boundary Condition"; "6.5.1 Molecular Dynamics Simulations (Background)"; "6.5.2 United Atom Model"; "6.5.3 Evaporation Coefficient"; "6.6 Results of the Kinetic Calculations"; "6.6.1 Results for $l^2 m = 1$ "; "6.6.2 Results for $l^2 m < 1$ ";
 "6.7 Kinetic Modelling in the Presence of Three Components"; "References"; "7 Heating, Evaporation and Autoignition of Sprays"; "7.1 Autoignition Modelling"; "7.2 Coupled Solution: A Simplified Model"; "7.2.1 Physical Model";
 "7.2.2 Mathematical Formulation"

Sommario/riassunto

Providing a clear and systematic description of droplets and spray dynamic models, this book maximises reader insight into the underlying physics of the processes involved, outlines the development of new physical and mathematical models, and broadens understanding of interactions between the complex physical processes which take place in sprays. Complementing approaches based on the direct application of computational fluid dynamics (CFD), *Droplets and Sprays* treats both theoretical and practical aspects of internal combustion engine process such as the direct injection of liquid fuel, subcritical heating and evaporation. Includes case studies that illustrate the approaches relevance to automotive applications, it is also anticipated that the described models can find use in other areas such as in medicine and environmental science.