MT-624 Heat Transfer in Fluid Flow

Heat transfer modes; Thermal boundary layers without coupling of the velocity field to the temperature field; Boundary layer equations for the temperature field; Forced convection for constant properties; Effects of the Prandtl number; Effects of energy dissipation; Effects of porous dissipation; Three dimensional momentum boundary layer solutions of the thermal boundary layer; Integral methods for computing heat transfer; Temperature dependent fluid flow properties and their effects on thermal and momentum boundary layer; Entropy generation minimization; Linear and non-linear thermal radiations; Thermal boundary layers with coupling of the velocity field to the temperature field; Boundary layer equations; boundary-layers with moderate wall heat transfer, natural convection, indirect natural convection, mixed convection.

Recommended book(s)
Reference Book(s)

1. H. Schlichting and K. Gersten, "Boundary-Layer Theory", 8th Edition, Springer-Verlag Berlin, 2016
2. Sadik Kakac, Yaman Yener, Anchasa Pramuanjaroenkij. "Convective Heat Transfer" 3rd Edition. CRC Press, 2013.
3. Theodore L. Bergmam , Adrienne S. Lavine, Frank P. Incropera, David P. DeWitt, "Heat and Mass Transfer", 8th Edition, 2018
4. Adrian Bejan, "Entropy Generation Minimization: The Method of Thermodynamic Optimization of Finite-Size Systems and Finite-Time Processes", 1st, CRC Press, 2013.
5. R. O. Fagbenle, O. M. Amoo, S. Aliu, A. Falana, "Applications of Heat, Mass and Fluid Boundary Layers", Woodhead Publishing, 2020.
6. P. H Oosthuizen and D. Naylor, "Convective Heat Transfer Analysis", McGraw-Hill International, New York, 1999.