

Preface

After a brief introduction this publication presents Fourier's well-known law of thermal conduction which constitutes the basis of any phenomenon related to transient heat transfer.

Then the author examines heat diffusion in a plane plate under specific conditions. In these cases it is possible to solve the second degree differential equation. This has been accomplished for a plate of infinite thickness, and then, within certain boundaries, for a plate of finite thickness as well.

By introducing a new dimensionless number indicated by X and with reference to Biot's number, the author introduces a computation method to determine the time required to obtain a particular result, without relying on finite differences program. This is a direct computation based on the number X , the value of which is shown in several Tables.

The method focuses on the following cases: plate immersed in fluid; plate heated or cooled on one side; tube heated or cooled on the outside surface; plate radiated on both sides or plate radiated on one side; transient heat transfer from one fluid to another through a plate; transient heat transfer from the outside fluid to the inside fluid in a tube.

Finally, a series of diagrams highlight the behavior of temperatures over time and based on location, or other significant quantities that are characteristic of the study being discussed.

Milano, Italy

Donatello Annaratone



<http://www.springer.com/978-3-642-19776-5>

Transient Heat Transfer

Annaratone, D.

2011, X, 46 p. 18 illus., Softcover

ISBN: 978-3-642-19776-5