

Book Review: *Studies in Network Thermodynamics*

Studies in Network Thermodynamics (Volume 5 of *Studies in Modern Thermodynamics*). L. Peusner. Elsevier, Amsterdam, 1986.

This book presents a formulation of thermodynamics and near-equilibrium irreversible processes in the framework of network physics, using generalizations of Kirchhoff voltage and current laws to describe flow and connectivity of the thermodynamic system. As such, it provides a useful framework for systematically analyzing complex thermodynamic and kinetic processes such as those found in membranes and biophysical processes.

The book is divided into seven chapters. The first chapter provides an introduction to those aspects of graph and network theory utilized in the remainder of the book, drawing analogies between electrical circuits and thermodynamic quantities. The second chapter discusses thermostatics in the framework of network theory. In Chapters 3–6 near-equilibrium transport phenomena (diffusion, chemical reactions, convection), Onsager's relations, and the principle of minimum entropy production are formulated in the context of network physics and in some cases generalized. Finally, Chapter 7 discusses application of the network approach to certain types of nonlinear phenomena. In each chapter, concepts are illustrated by specific examples, a number of them from membrane physics.

The author makes clear at the outset that this is not a textbook on network thermodynamics. Indeed, it appears to be aimed at readers who already have a good working knowledge of thermodynamics and transport phenomena. But for scientists faced with complex thermodynamic systems to analyze, it is a useful book to read, and presents a view that might some day be a useful aid in teaching nonequilibrium thermodynamics.

L. E. Reichl
Center for Statistical Mechanics
University of Texas
Austin, Texas 78712