CHAPTER OVERVIEW

5: Flow, Transport and Exponential

This chapter focuses on phenomena involving real fluids with viscosity and electric circuits with resistance. The effect of resistance in both kinds of flow means that energy will be reduced in the fluid system while thermal energy systems will increase. Frequently the flow is described as being *dissipative*. We call the model/approach we use to make sense of dissipative flow the *Steady-State Energy Density Model*, where the flow is constant over time. In the second part of the chapter we generalize the underlying ideas about flow to flow phenomena in which changes in energy are not of paramount importance. Rather, the focus is simply on the "fluid" and medium properties and the "driving force" that keeps the flow going. The "thing" that flows can be a real fluid, electric charge, energy, or other things that diffuse – in short, any phenomenon in which the flow of something becomes constant can be understood with this approach/model, which we call the *Linear Transport Model*. Toward the end of the chapter we look at examples where the flow is no longer constant, but displays exponential decay behavior.

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