

1.1: Introduction

Thermodynamics is a subject that has a wide variety of applications, including many in practical and engineering contexts. However, by choice, I shall be treating this subject from a very “academic” point of view, in which disembodied forces will compress ideal gases with frictionless pistons, seemingly far removed from the real engines of steel and gasoline which engineers must design. This approach may appeal to those with an academic bent – but is it likely to be useful to the aspiring engineer who lives and works in the real world? Need the practical engineer know and understand all this airy-fairy mumbo-jumbo? I would just argue this – that the “academic” approach deals with the *fundamental physical principles* upon which all practical applications must be built, and that an engineer above all others must thoroughly understand these principles. The fundamental principles do not cease to apply in the practical world!

I don’t expect to get down to serious thermodynamics in the opening chapter. Instead I shall just discuss a few isolated, unrelated miscellaneous bits and pieces that I thought worth doing. Furthermore, anyone who opens a book on thermodynamics will see the symbol ∂ liberally sprinkled over almost every page, so I thought I’d write a short chapter – Chapter 2 - on partial derivatives. That will not be intended as a formal course in mathematics, but just a brief summary of the main properties of partial derivatives that you are likely to need. Thus I shan’t get down to serious thermodynamics until Chapter 3.

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