A Vectors and Matrices

At occasional places in this text use is made of results from linear algebra. This Appendix is meant to review the concepts that are used. More details can be found in textbooks on linear algebra or, for example, in Davidson and MacKinnon (1993, Appendix A), Davidson (2000, Appendix A), or Greene (2003, Appendix A). Some of the more complex topics are used in a limited number of places in the text. For example, eigenvalues and the rank of a matrix only play a role in Chapter 9, while the rules of differentiation are only needed in Chapters 2 and 5.

A.1 Terminology

In this book a **vector** is always a *column* of numbers, denoted

$$a = \begin{pmatrix} a_1 \\ a_2 \\ \vdots \\ a_n \end{pmatrix}.$$

The **transpose** of a vector, denoted $a' = (a_1, a_2, \ldots, a_n)$ is a row of numbers, sometimes called a row vector. A **matrix** is a rectangular array of numbers. Of dimension $n \times k$, it can be written as

$$A = \begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1k} \\ a_{21} & a_{22} & & \\ & & \ddots & \\ a_{n1} & a_{n2} & \cdots & a_{nk} \end{pmatrix}.$$