the *sequence of partial products* and, by definition, the infinite product is said to *converge* if the sequence of partial products converges.

In this part of the exercise, you are to study the infinite products of the following two types:

$$(1)\ \prod_{n=1}^{\infty}(1-a_n), \qquad (2)\ \prod_{n=1}^{\infty}(1+a_n),$$

where $a_n = 1/(n+1)^p$, for values $p = 1, 2, 3$. Specifically:

Set up two dimensional arrays `prod1` and `prod2` and use them to store the values of the partial products for $n = 1, \ldots, 180$ and $p = 1, 2, 3$. Then display the information graphically (as you did for series) with five sequences of partial products in the same pictures (five colors will help you keep things straight). The five sequences should be the type (1) products for $p = 1, 2, 3$, and the type (2) products for $p = 2, 3$. From your picture, try to determine if the infinite products converge and to what values. Annotate your picture with the results. What happens in the type (2) product for $p = 1$?

6. **(Newton's Method)** Use the code from the case study (cf. the CD-ROM) to find, approximately, all roots of the equation $f(x) = 0$ in the interval I, where f and I are from one of the items below. Also: (i) produce the graphics showing convergence of Newton's method to the root (or roots), (ii) compare the results found by our code with the results found by using Maple's `fsolve` command, and (iii) annotate your graphics appropriately.

   (a) $f(x) = x^2 - x^4 - 0.1$, for x in $I = [-1.2, 1.2]$.

   (b) $f(x) = x^3 - x - 0.2$, for x in $I = [-1.5, 1.5]$.

   (c) $f(x) = \sin x - \cos 2x + 0.2$, for x in $I = [0, 6]$.

7. **(Iterated Maps)** Work the exercises on the CD-ROM in CD Chapter 3 that pertain to iterated maps of an interval into itself.

3.4 Maple/Calculus Notes

3.4.1 Riemann Sums and the Definite Integral

Most calculus books motivate and define the definite integral $\int_a^b f(x)\,dx$ in pretty much the same way. However, there are slight differences in the definitions and the notation, and so we summarize a common approach here. You should consult your calculus book for how this is done as well as reading this.