Chapter 12 Figures From

MATHEMATICAL METHODS for Scientists and Engineers

Donald A. McQuarrie

For the Novice Acrobat User or the Forgetful

When you opened this file you should have seen a slightly modified cover of the book *Mathematical Methods for Scientists and Engineers* by Donald A. McQuarrie, a menu bar at the top, some index markers at the left hand margin, and a scroll bar at the right margin.

Select the **View** menu item in the top menu and be sure **Fit in Window** and **Single Page** are selected. Select the **Window** menu item and be sure **Bookmarks** and **Thumbnails** ARE NOT selected.

You can and probably should make the top menu bar disappear by pressing the function key F9. Pressing this key (F9) again just toggles the menu bar back on. You may see another tool bar that is controlled by function key F8. Press function key F8 until the tool bar disappears.

In the upper right hand corner margin of the window containing this text you should see a few small boxes. DO NOT move your mouse to the box on the extreme right and click in it; your window will disappear! Move your mouse to the second box from the right and click (or left click); the window containing this text should enlarge to fill the screen. Clicking again in this box will shrink the window; clicking again will return the display to full screen.

The prefered means of navigation to any desired figure is controlled by the scroll bar in the column at the extreme right of the screen image. Move your mouse over the scroll bar slider, click, and hold the mouse button down. A small window will appear with the text "README (2 of 15)". Continuing to hold down the mouse button and dragging the button down will change the text in the small window to something like "12.4 (6 of 15)". Releasing the mouse button at this point moves you to Figure 12.4 of Chapter 12. The (6 of 15) indicates that Figure 12.4 resides on page 6 of the 15 pages of this document.

ANIMATIONS

There are no animations in this chapter at this time.

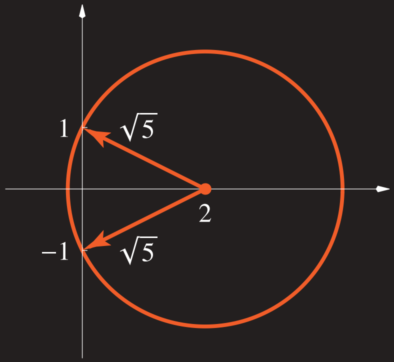

Figure 12.1
A pictorial aid to determining that the distance from the point $x = 2$ to the points $x = \pm\, \mathrm{i}$ is $\sqrt{5}$.

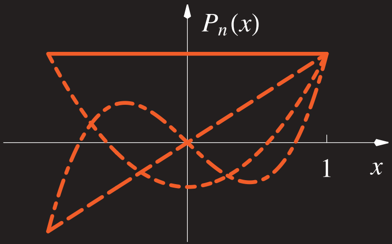

Figure 12.2
The first few Legendre polynomials plotted against x: $P_0(x)$ (solid), $P_1(x)$ (long dashed), $P_2(x)$ (short dashed), and $P_3(x)$ (long-short dashed).

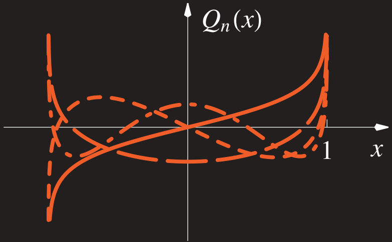

Figure 12.3
The first few second solutions, $Q_0(x)$ (solid), $Q_1(x)$ (long dash), $Q_2(x)$ (short dash), $Q_3(x)$ (dash-dot), to Legendre's equation plotted against x. Note that they all diverge at $x = \pm 1$.

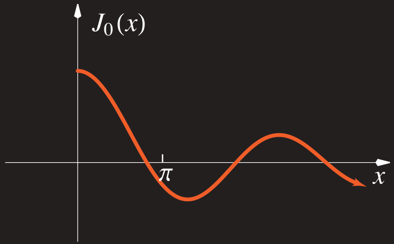

Figure 12.4
The zero-order Bessel function of the first kind, $J_0(x)$, plotted against x.

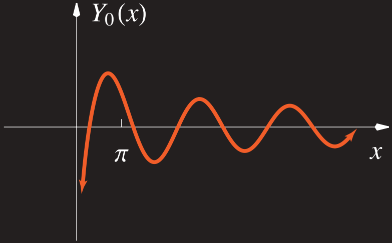

Figure 12.5
The zero-order Bessel function of the second kind, $Y_0(x)$, plotted against x.

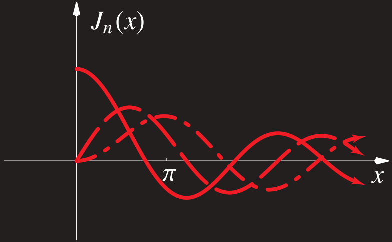

Figure 12.6
The Bessel functions $J_0(x)$ (solid), $J_1(x)$ (dashed), and $J_2(x)$ (dash dot), plotted against x.

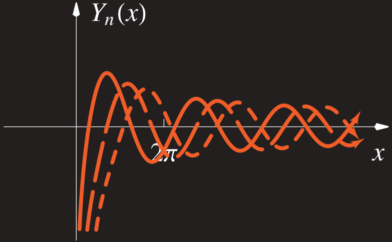

Figure 12.7
The Bessel functions of the second kind $Y_0(x)$ (solid), $Y_1(x)$ (long dashed), and $Y_2(x)$ (short dashed), plotted against x.

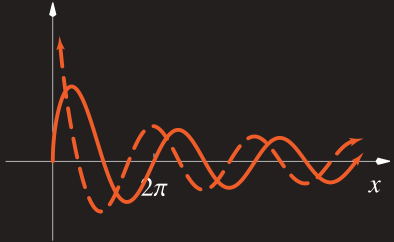

Figure 12.8
The Bessel functions $J_{1/2}(x)$ (solid) and $J_{-1/2}(x)$ (dashed) plotted against x.

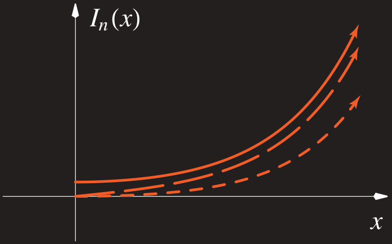

Figure 12.9
The modified Bessel functions of the first kind, $I_0(x)$ (solid), $I_1(x)$ (long dashed), and $I_2(x)$ (short dashed), plotted against x.

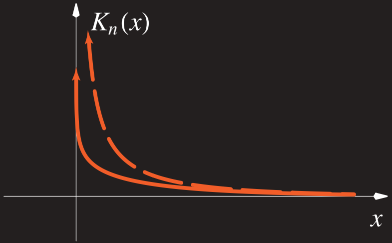

Figure 12.10
The modified Bessel functions of the second kind, $K_0(x)$ (solid) and $K_1(x)$ (long dashed), plotted against x.

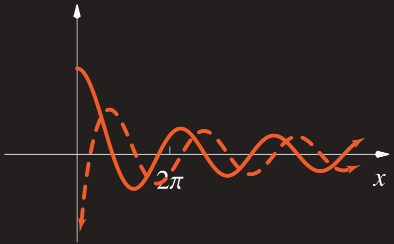

Figure 12.11
The zero-order Bessel functions $J_0(x)$ (solid) and $Y_0(x)$ (dashed) plotted against x.

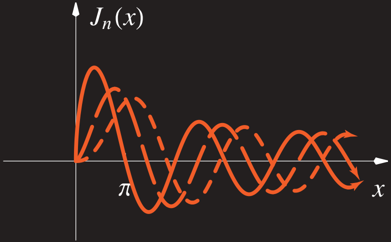

Figure 12.12
The Bessel functions, $J_{1/2}(x)$ (solid), $J_{3/2}(x)$ (long dashed), and $J_{5/2}(x)$ (short dashed) plotted against x.

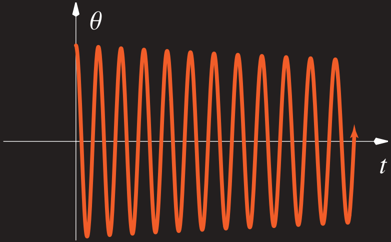

Figure 12.13
The solution to Example 4 (multiplied by $2/\pi\lambda^2\theta_0$) plotted against $4gt/b$ for $\lambda = 626$.