Chapter 7 Figures 36 To 47 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 13)". Continuing to hold down the mouse button and dragging the button down will change the text in the small window to something like "7.39 (6 of 13)". Releasing the mouse button at this point moves you to Figure 7.39 of Chapter 7. The (6 of 13) indicates that Figure 7.39 resides on page 6 of the 13 pages of this document.

ANIMATIONS

There are no animations associated with these figures.

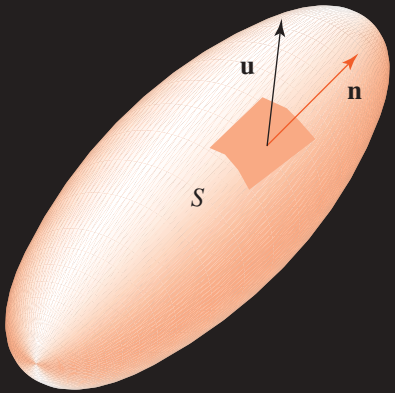

Figure 7.36
An arbitrary fixed volume V located within a fluid; S is the boundary of V.

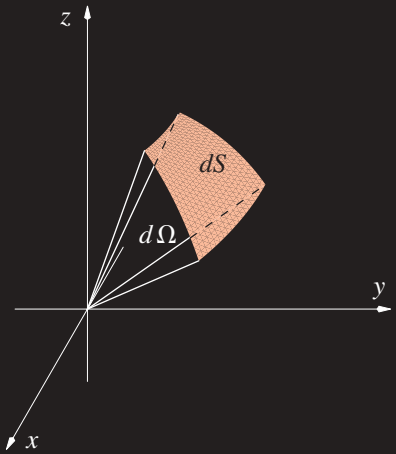

Figure 7.37
A solid angle element $d\Omega$.

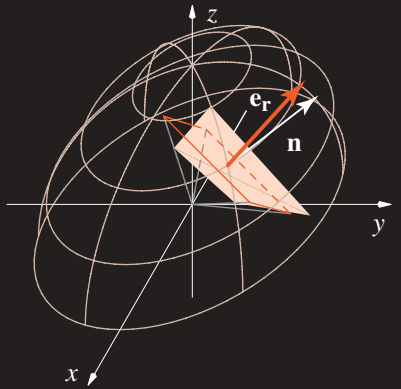

Figure 7.38
The projection of $\mathbf{e}_r \cdot \mathbf{n}\, dS$ onto the surface of a sphere of radius a.

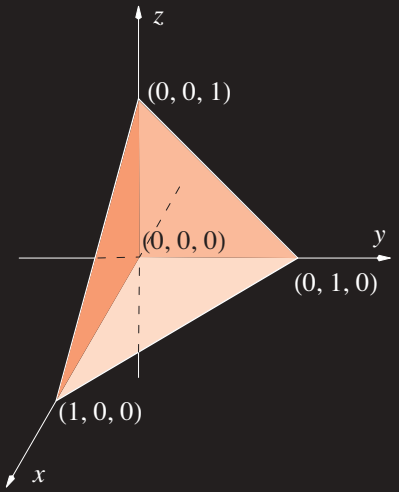

Figure 7.39
A tetrahedron with vertices (0, 0, 0), (1, 0, 0), (0, 1, 0), and (0, 0, 1).

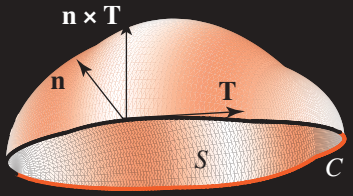

Figure 7.40
A surface and its boundary curve.

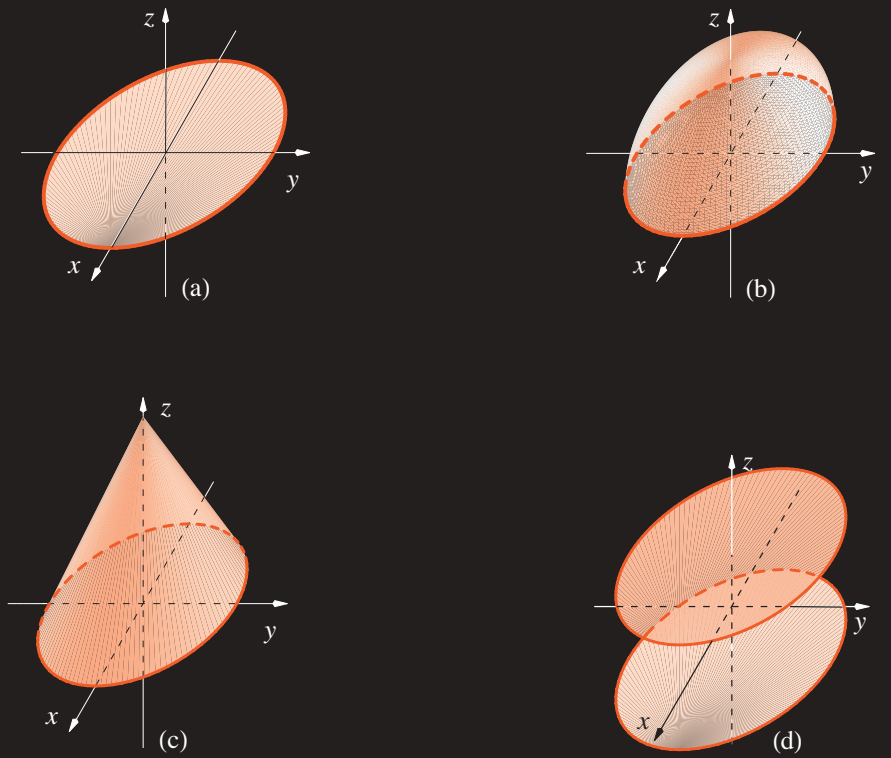

Figure 7.41
Various capping surfaces of a unit circle. (a) The unit disk itself, (b) the surface of a hemisphere, (c) the surface of a circular cone, and (d) the top and bottom surfaces of a right cylinder.

Figure 7.42
A right-hand rule that is used to illustrate the relationship of the direction of the unit normal vector to S and the direction in which we traverse the boundary curve C in the application of Stokes's theorem.

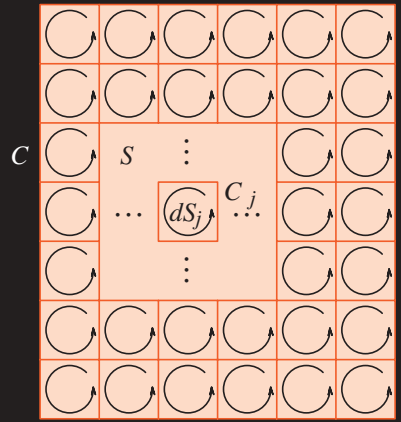

Figure 7.43
A surface S and a boundary curve C, where the surface is partitioned into a mesh of surfaces dS_j with boundary curves C_j.

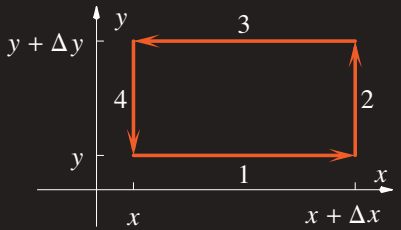

Figure 7.44
A pictorial aid to the evaluation of $\oint \mathbf{v} \cdot d\mathbf{r}$ around one of the surfaces dS_j in Figure 7.43.

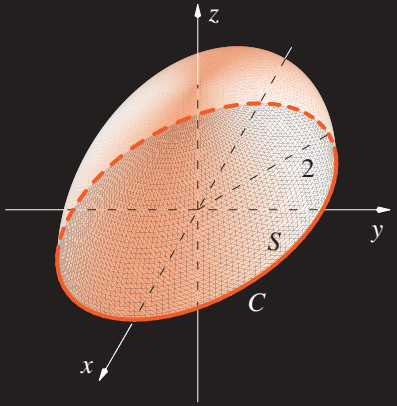

Figure 7.45
The surface and its boundary curve that are used in Example 1.

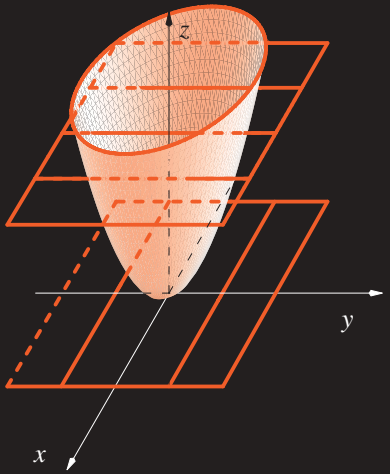

Figure 7.46
The circular paraboloid $z = x^2 + y^2$ and the planes $z = 0$ and $z = 1$ used in Example 2.

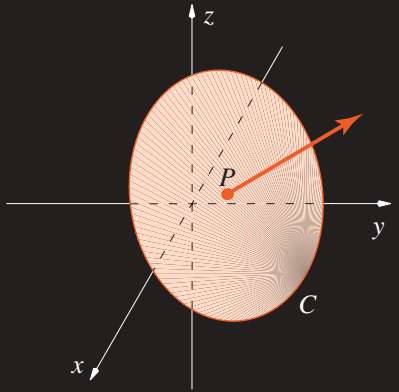

Figure 7.47
A circular disk centered at a point P with a boundary curve C.