9.3: Some Functions of the Masses

In section 9.5 I am going to consider the motion of two masses, M and m around their mutual centre of mass under the influence of their gravitational attraction. I shall probably want to make use of several functions of the masses, which I shall define here, as follows:

Total mass of the system:

$$\mathbf{M} = M + m. \tag{9.4.1}$$

"Reduced mass"

$$\mathrm{m} = \frac{Mm}{M+m}. \tag{9.4.2}$$

"Mass function":

$$\mathfrak{M} = \frac{M^3}{(M+m)^2}. \tag{9.4.3}$$

No particular name:

$$m_+ = m\left(1 + \frac{m}{M}\right). \tag{9.4.4}$$

Mass ratio:

$$q = m/M. \tag{9.4.5}$$

Mass fraction:

$$\mu = m/(M+m). \tag{9.4.6}$$

The first four are of dimension M; the last two are dimensionless. When $m << M$, $\mathrm{m} \to m$, $\mathfrak{M} \to M$ and $m_+ \to m$.